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Railway Age

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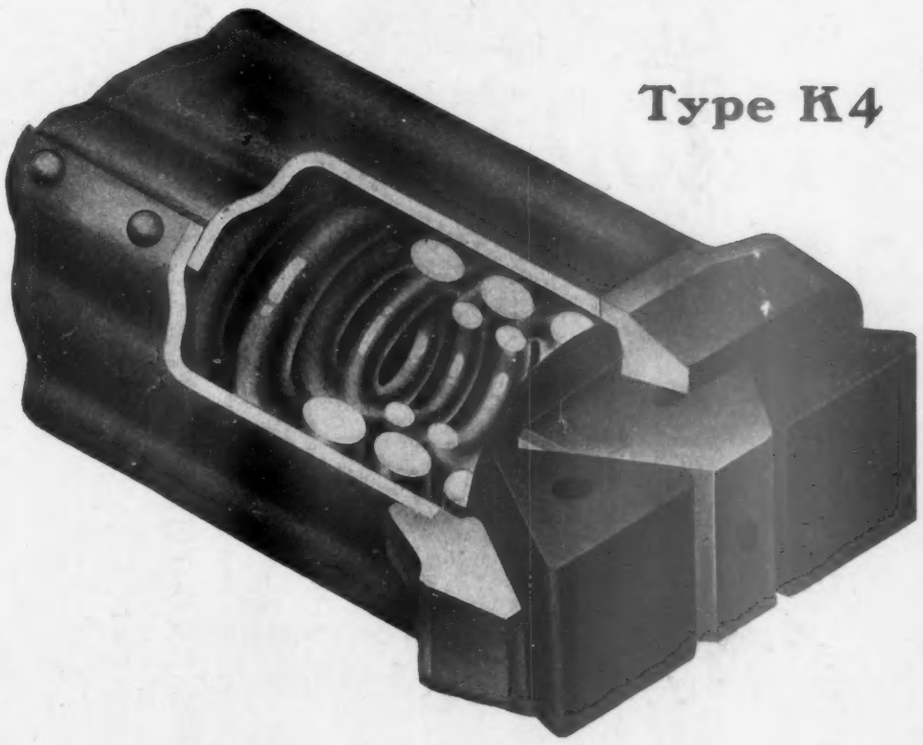

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Alphabetical Index to Advertisements, Page 76 Classified Directory of Advertisers, Page 72

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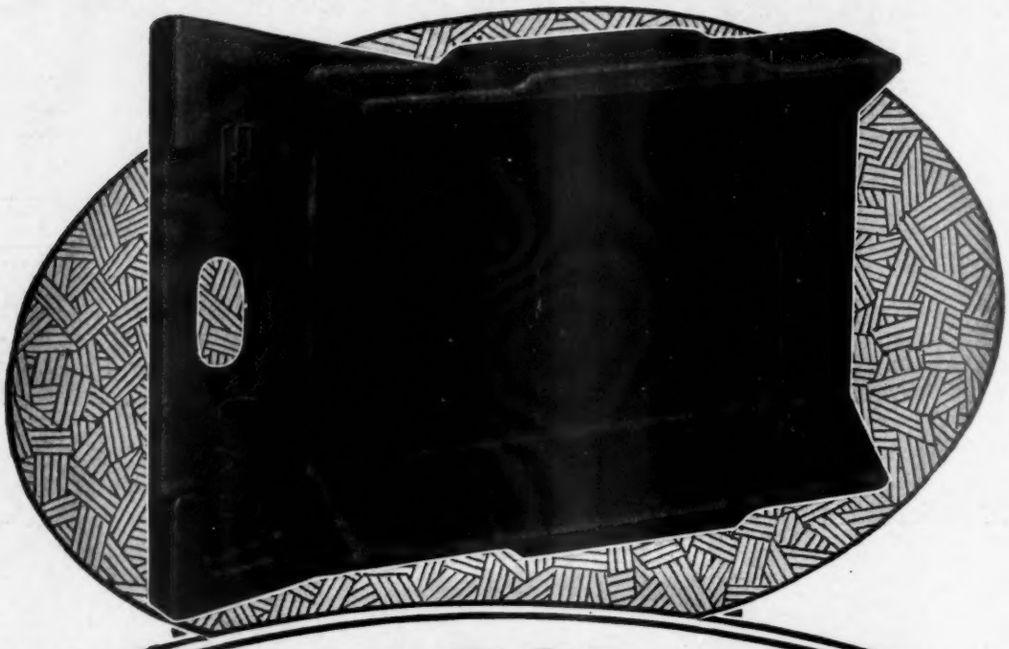

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EDITORIAL

The Table of Contents Will Be Found on Page 5 of the Advertising Section

A New Kind of Prize

The letter of "Veteran," printed on another page, is a rather wordy plea for a very simple object; spend more money to educate and improve your conductors, enginemen, ticket sellers and other men who, when not efficient, can be said to be actually depleting profits. The only specific proposal here offered for making increased expenditures is that for a prize of $100 to get further information on how to be a first-class trainmaster. The *Railway Age* is on record as approving prizes, in any and every direction that may hold out hope of making progress in that way, and we might adduce a page-full of arguments agreeing with our correspondent; but in view of his suggestion that this discussion might possibly degenerate into a rehearsal of things which have become tiresome by being too often repeated, and to get away from academic talk and into present practical life, we will give "Veteran" a bit of encouragement which is new and most thoroughly up-to-date; namely, the action of the Rock Island, as noticed in the *Railway Age* of August 18, page 315, in offering $100 to the officer or employee who does the best in economizing by saving labor or material in the month of August. This proposal is most commendable. The idea may have to be worked out in a good many ways and at the expense of a good deal of time and patience; but there surely must be in it much food for thought. And, as Mr. Forman has suggested, "thought" is an element of which the railroad manager often finds a scarcity. Prizes for fuel-saving and for excellence in track maintenance have for many years held a considerable degree of popularity, in spite of adverse conditions; and it is high time that the principle received more recognition in other departments. The results of the Rock Island experiment will be looked for with great interest.

The Cost of Educating Officers

What does it cost to educate a railroad officer? What does it cost to educate a man for a subordinate supervisory position on a railroad? These questions were suggested by a communication on "More Training for Transportation Officers" in the *Railway Age* of September 1, page 375. Various estimates have been made at different times as to the cost of taking a new man into service to replace one who had dropped out. We know that the cost of the turnover is very considerable, but it is difficult to segregate the various factors which enter into the calculation, in order to arrive at any accurate result. It is, of course, even more difficult to arrive at accurate results in estimating the cost of training a man for a supervisory position. What is meant in this instance by the word "cost"? It would include any direct costs of training him—which today are insignificant, on most roads at least—and the expense of correcting mistakes, etc., while he is gaining experience on the new job. It would also include the loss in efficiency and morale of those under him, due to needless misunderstandings, etc. Possibly the whole matter might be presented to better advantage in a somewhat different form: How much can a railroad save by taking steps to see that the men in supervisory positions are properly trained? There can be no doubt but that those railroads which are making the greatest expenditures and giving the most thought to the selection and training of shop apprentices, for instance, are getting better service from these young men and are realizing a good return in dollars and cents on the increased expenditures necessary to provide an adequate course of instruction and to see that the classroom studies are co-ordinated with the shop instruction. In the same way a man who is trained and coached for a supervisory position, so that he understands the simple fundamentals involved in properly leading those under him, will show a greatly increased efficiency for his department and will avoid many costly mistakes which might be made by a man who had not received such training and coaching. Railroads can well afford, therefore, to make very considerable expenditures to improve their practices in this respect. The trail has been blazed by a number of the more progressive manufacturing industries. Will the railways take advantage of these developments?

What Statistics Show

The operating statistics compilations formulated by the Operating Statistics Section of the Railroad Administration, and since continued in less elaborate detail in the O.S. forms of the Interstate Commerce Commission, have made available to those interested in railroad activity a vastly increased amount of data beyond that previously available concerning the current volume and efficiency of railway operation. The several statistical units, even though they have been in existence since 1918 or 1919 (and, of course, many of them before that time), are still so new to many who try to use them that the question frequently arises as to just what are the conclusions that may properly be drawn from a given presentation of figures of trainload, carload, net ton-miles per train-hour, pounds of coal per 1,000 gross ton-miles, etc. There is, therefore, room for analysis of the subject in detail and discussion of what information may or may not be read from the statistics relating to all the railroads in general, or individual roads in particular. The *Railway Age* feels itself fortunate in being able to offer to its readers an article containing such an analysis and discussion; it will be found on another page of the present issue under the title "I.C.C. Statistics and Efficiency." The article, written by J. E. Slater, special assistant to the general manager of the New Haven, follows another written on a similar subject which appeared in the *Railway Age* of July 21, 1923, page 115. Mr. Slater's present article brings out many important points. One is the undesirability and unfairness of judging operating efficiency with but a single statistical unit—such as trainload or carload—as a measure. The most important single element contained in the article, however, we believe to be the emphasis placed on the need for caution as concerns the drawing from the statistics of conclusions not properly warranted by underlying conditions, which cannot be shown in statistical compilations. All of us know of instances in which operating statistics have been improperly used. This is because in most of such instances attempts have been made to compare the operating results of one road or division with another, without due regard to the grades, curvature,

character of the traffic, etc., of the respective operating units. Mr. Slater's article by no means covers all of this larger subject of railway operating statistics. It is, however, one of the most valuable contributions to the subject which has thus far been presented.

Watch for the Exceptional Case

There is no question but that railroads realize the importance of competent enginemen and that generally effective methods are used for training these men in the safe and efficient handling of trains. Examinations, both oral and written, are conducted at regular intervals on some railroads, and other roads make surprise checks at any time which may seem desirable. In spite of these precautions, however, it is too often true that traveling engineers have more locomotives and crews on their respective divisions than it is possible for them to give the desired individual attention. Consequently enginemen are sometimes found at the throttle who are not thoroughly competent, as indicated by the following well authenticated case. An engineman in freight service, who had but recently been set up from the ranks as fireman, opened his throttle and suddenly saw something move at the end of the running board. Immediately shutting the throttle, he went around to the front of the engine and examined curiously the superheater damper indicator which had gone up as soon as he opened the throttle. This man was totally at a loss to know what this indicator was, or why it was on the locomotive. If he did not understand the working of such a common locomotive appliance, what assurance is there that he was familiar with all other parts of a locomotive, the knowledge of some of which might be more essential to safe operation? In another case, an engineman did not know the purpose of floating bushings on the main crank pins and was seriously considering taking the locomotive back to the enginehouse because of a loose bushing. These cases are of course exceptional and should not be given too much weight, but they point to the need of great care in training enginemen and unceasing vigilance in checking up their knowledge and ability.

The Channel Tunnel

The Railway Gazette (London) has recently published in full a memorandum dealing with the feasibility of constructing the much-discussed railway tunnel from England to France under the English Channel. This memorandum was written by Sir Percy Tempest, chief engineer of the Channel Tunnel and general manager of the Southern Railway, and was addressed to the Channel Tunnel Committee of the House of Commons. Sir Percy deals with the feasibility of the tunnel from three viewpoints, viz., engineering, military and financial. Any military objections to the tunnel, he says, have been rendered invalid by the development of aircraft; the tunnel is feasible from an engineering standpoint and as soon as this is proved to the investing public the necessary financial backing can be secured. The stratum through which the tunnel would be bored, Sir Percy says, is chalk marl, *i.e.* chalk infiltrated with clay. It is highly impervious to water and does not, like clay, swell when exposed to the atmosphere—in short, an ideal substance to be penetrated by a tunnel. Boring machines starting simultaneously from England and France, each advancing 120 ft. a day, would meet in 2½ years and the whole work could be completed in 4½ years. The project would cost about £29,000,000 and net revenue on a basis of existing cross-channel traffic would come to £1,595,000—or more than 5 per cent on the investment; moreover, the tunnel would probably attract more traffic than that now moving by vessel. The construction of this tunnel would unite the railways of England and the continent and greatly facilitate travel. It is interesting from both a transportation and an engineering standpoint that the advisability and feasibility of this project is again being seriously discussed while at the same time on this side of the Atlantic the proponents of a railway and highway bridge over the Hudson at New York, a project of almost similar magnitude, have recently presented their case to the army engineers. Probably before a great many years have passed the world will see the beginning of two more monuments of engineering skill as applied to transportation.

What It Costs the Railways to Earn a Dollar

THE railways of the country as a whole are handling more business than ever before and making a larger net return than for some years. It is natural many persons should infer from these facts that the railways could make substantial reductions of rates. They do not know how much it costs the railways to earn a dollar and what in consequence would be the effect upon their net return of any substantial reduction of rates.

The total earnings of the Class I railways in the first six months of 1923 were $3,096,922,738. This was much more than they ever earned in any six months before the war. But their operating expenses and taxes in these months were $2,605,205,321. This was over 84 per cent of what they earned. In other words, it cost them more than 84 cents in operating expenses and taxes to earn each dollar that the public paid them. In the first six months of 1922 it cost them 85.2 cents and these months of 1921 93.2 cents in expenses and taxes, to earn each dollar the public paid them. The showing made in the first half of 1923 was better than in the first half of 1922 or 1921. But in the entire year 1917 it cost the railways only 75 cents in expenses and taxes to earn each dollar they received. The railways are very far from having restored the pre-war relationship between earnings, expenses and taxes.

After having paid expenses and taxes, and also equipment and joint facility rentals, the railways have left what is called "net operating income." They can use this to pay interest and dividends. The net operating income earned by the Class I roads in the first six months of the year was at the annual rate of 5.64 per cent on their tentative valuation. In actual figures it was $443,864,069, and was 14.3 per cent of the total earnings. Many people believe a large reduction of rates could be made merely by reducing the net return the railways are allowed to earn. They talk glibly about a reduction of 20 or 25 per cent in rates. These figures mean that if all other things had been as they were in the first six months of 1923, but the rates of the railways had been 14.3 per cent less in the first six months of 1923 than they were, they would not have earned a cent of net return.

The railways are doing better than for some years, but the ratio of their operating expenses and taxes to their total earnings is still much too high. It still costs them so much to earn a dollar that even with present rates a substantial decline of total earnings due to a business depression would soon make the margin between earnings and expenses and taxes dangerously small.

The transportation industry needs a reduction in the number of cents that it costs to earn a dollar and in the long run this must and will be secured by increased efficiency of operation and other means. No substantial reduction of rates can be hoped for until then.

The Relation of Signaling to Operation and Traffic

SIGNAL departments are demonstrating their ability to help keep traffic moving with dispatch and safety. Some of the progressive managements in turn are beginning to recognize more than ever before the aid that a properly designed and installed signal system can render in the handling of their business in an expeditious manner and the help it can give them in competing successfully with other roads soliciting business in the same territory. It is only recently that signaling has assumed an important place in the plans of railway managements as an operating factor.

An interesting example of what the signal departments are accomplishing is an installation of a low-voltage switch machine layout which was recently made at the end of double-track in busy territory. In this case the total cost of the installation amounted to $6,277, and it resulted in the elimination of 4,380 train stops in a year with a saving in time of trains and a decrease in consumption of coal which yielded a net saving paying approximately 143 per cent on the investment after deducting the interest and cost of maintenance.

With the developments that have taken place recently railway officers should realize that their signal installations are primarily an operating facility and that small expenditures at certain points will frequently relieve congestion and reduce delays over an entire district. Operating officers should encourage their signal departments to recommend means for the elimination of points of congestion. The signal department, if it has been functioning properly, is in a position to furnish necessary information from analyses which it has made of these conditions. Not only is signaling an asset to the operating department, but traffic officers may well emphasize the fact to prospective shippers that a signal installation is an insurance to them that their shipments will be handled more expeditiously than would be the case in its absence.

Public Sentiment and the Railroads

THERE is no question whatever that public sentiment regarding the railways is better than it was a year ago, or even six months ago. This is due to two things, first, to the good service the railways have been rendering shippers, although they have been handling more freight business than ever before, and secondly, to the fact that more and better work to educate the public regarding railway matters has been done within recent months than ever before in the same length of time.

Not only has public sentiment improved, but the earnings of the railways as a whole are more satisfactory than for some years. Unfortunately this is not true of the earnings of the western roads, but it is evident that even this fact and its significance with respect to proposed reductions of rates are becoming known and understood in western territory. There has recently been less propaganda against the railroads than for some time.

While this improvement in the situation should be cheering to railway officers, there is a danger in it. This is that it may lull into a false sense of security railway officers, investors and other persons who have recognized the menace to the welfare of the country involved in the propaganda against the railways which has been carried on for some years. Nobody who has closely followed recent developments can have any serious doubt that the railways are now in the calm which precedes a storm. How damaging that storm will be will depend upon the measures that are adopted for meeting it. There are still many millions of people who are suspicious of railway management and prone to believe that railway rates are unnecessarily high and that the railways could be much more economically managed, thereby making possible reductions of rates. This adverse sentiment is largely the result of many years of propaganda against the railways and of failure to combat this propaganda effectively. There are numerous persons who for special reasons of their own are disposed and ready as soon as conditions seem favorable to renew the attacks upon the railways of which there recently has been a reduction. There are many radicals, some of whom have been elected to Congress, whose stock in trade consists principally of propaganda against the railroads, and who are sure to renew and redouble their attacks upon them in the near future. As the next session of Congress approaches, or even sooner, the railways seem sure to be the objects of as bitter and determined onslaughts as they ever were in the past. They will be fortunate if they escape damaging legislation next winter, and if they escape such legislation they may find the railroad question thrown into the next national political campaign as one of the principal issues.

In these circumstances railway officers and investors and other persons who believe the national welfare demands that the railways be allowed to prosper reasonably and that private ownership be preserved should prepare to carry on such a campaign of public education regarding the railroad situation and the nation's transportation needs as was never carried on before in this country. The results of the educational work that already has been done are important and unmistakable, but what already has been done is but a small part of what should be done. The railways should be assisted in the struggle by every business interest and every man that wants to see the country provided with adequate means of transportation and the progress of socialistic ideas and legislation arrested, but railway officers must continue to take the lead in educating the public about their business.

The methods that should be used in this educational work often have been mentioned in these columns, and to mention them now would be to repeat what has been said before. The two agencies which have been most widely and effectively used in the past, both for attacking and defending the railroads as well as other kinds of institutions, are the spoken word and the written word. The spoken word has not been used effectively against the railways merely in public addresses, although for years they have been the objects of attack in speeches made from many platforms. Some of the most effective propaganda which has been carried on against them has consisted of incorrect and untrue statements regarding their management which have been repeated in private conversation until almost innumerable persons have heard and believed them.

Railway officers and traffic representatives, and also officers and sales representatives of many other business concerns, can do much to nullify this kind of propaganda if they will make it part of their work to tell the facts about the railroad situation to persons with whom they come in contact. They cannot, however, tell the facts, especially about the situation of the railways as a whole, without first knowing them, and, therefore, they should make special efforts to arm themselves with information bearing upon railway matters that are the subjects of public controversy. Statements of fact made by railway officers to their own neighbors regarding railway matters carry great weight and, therefore, if railway officers of all departments and ranks would take advantage of every opportunity to talk at meetings of their local farmers and business men the results gained in the aggregate would be very large. It is probable, however, that more people can be reached and influenced by what is printed than

by what is spoken, and, therefore, no effort should be spared to present the facts about the railroads through publicity material and paid advertising. There has been an increase within the last two years in the amount of publicity work and public relations advertising done by groups of railways, and especially by individual railways. If this is further increased the effect produced on public opinion will be very great.

The struggle over railroad regulation which will occur in the next Congress will largely determine the future of the railroads of this country. The result of that struggle will depend upon public sentiment. No effort should be spared to cause public sentiment to crystallize in favor of sound and constructive regulation.

New Books

Proceedings of the Air Brake Association 1923. *Edited by the secretary, F. M. Nellis, 165 Broadway, New York. 285 pages, bound in leather.*

This book contains the proceedings of the Thirtieth Annual Convention of the Air Brake Association which was held in Denver, Col., May 1, 2 and 3, 1923. The reports submitted cover Expediting Train Movement; Charging Freight Trains; Causes for Slow-Acting Air Compressors; Feed Valve Tests; Relation of Train Control to the Air Brake; Service Records and Maintenance Costs; Standardization of Air Brake Repairs; Laundering Air Compressors, and Maintenance of Air Compressors.

Artificial Respiration, Manual of. By Captain G. R. G. Fisher. 80 pages. 4¾ in. x 6¼ in. Boards. The Stratford Company, 240 Boylston street, Boston, Mass. Price, 75 cents.

This is a well illustrated and clearly written handbook giving minute directions how to resuscitate persons who have stopped breathing and apparently are dead. It is dedicated especially to electrical workers, policemen and others who ought to know what to do in such emergencies. It gives prominence to the "Schaeffer" and the "Sylvester" methods. Railroad surgeons do not agree precisely with the author in every detail of the processes described, but they call it an excellent book. The author, now of Omaha, Nebraska, has had extensive experience with the Red Cross (during the war) and in the British army.

A Cumulative Edition of the Interstate Commerce Act. Loose leaf, 5½ in. by 8 in. Bound in cloth. Published by Simplex Index System, Inc., 900 Twentieth St., N. W., Washington, D. C. Price $10.

The purpose of this cumulative edition of the interstate commerce act is to present at one reading the development of the statute from its original enactment in 1887 through the various stages of amendment, a distinctive character, or combination of characters, being used as an underscore for each amendment and a key to the underscores of each section being carried at the top of the page. This shows at one reading all the changes since the original enactment, including matter which has been repealed with a reference indicating the act by which the repeal was effected. Where addition has not been made to any paragraph since its enactment, the date of the enactment is given and no underscore is used. It has heretofore been necessary to make a cumbersome, tedious and confusing comparison of the texts of the various statutes to ascertain the legislative development of the act, and the form of this edition therefore makes it especially useful to lawyers and others who have occasion to use the statute with reference to the time and circumstances under which additions to, eliminations from, and modifications of it have been made. As further amendments are made they will be included in the text, and new sheets will be prepared to be substituted for those in which changes are made.

New Books and Special Articles of Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

The Chinese Railway System, by H. Stringer. An historical and descriptive work printed by order of the Chinese Board of Communications. Author is resident engineer, Peking-Mukden Railway. 216 p. map. Published by Kelly & Walsh, Shanghai.

The Farmer and the Railroads, by Samuel Harden Church. Address at annual convention of New Jersey farmers, Aug. 15, 1923. 11 p. Published by Carnegie Press, Pittsburgh, Pa.

The Principal Factors in Freight Train Operating, by Philip Burtt. A textbook on economics of freight train operation in British Isles, with some comparison between British and American equipment and practices. 208 p. Published by George Allen & Unwin, London, England.

Periodical Articles

The Disappearing Apprentice, by Forrest Crissey. Comparison between wages paid by large transcontinental railway to holders of "white-collar" and shop jobs, p. 50. Saturday Evening Post, September 1, 1923, p. 6-7, 46-52.

Institute of Transport Examination Scheme for Graduates and Associate Members. Syllabuses of subjects required with suggested texts. Editorial comment, p. 2. Modern Transport, August 18, 1923, p. 5-7.

The First Steam Locomotive Run on Rails in America, by Franklin DeR. Furman. Letter directing attention to locomotive constructed and operated in 1826 by Col. John Stevens of Hoboken. Mechanical Engineering, September, 1923, p. 560.

The Hall of Fame for American Inventors, by Fairfax Downey. National engineering museum to be established at Washington, and names of early inventors of railroad equipment and appliances who will be included. New York Tribune Magazine, September 2, 1923, p. 9.

The Iron Law of Prices; What the Traffic Will Bear. Editorial in Collier's Magazine, September 1, 1923, p. 18.

La Follette, Shipstead and the Embattled Farmers. What's Happening in Wisconsin and Minnesota and Why, by Chester H. Rowell. Includes summary of what the farmers in these states want done about several other things besides railroads. World's Work, August, 1923, p. 408-420.

A New Cuban Problem. Newest phase of Cuban railroad complications discussed and interpreted. Literary Digest, September 1, 1923, p. 21-22.

Proposed Regulations for Fire Protection Covering Construction and Protection of Docks, Piers and Wharves, by Charles H. Fischer. Results of a study of fires at railroad and other piers. Port and Terminal, September, 1923, p. 18a-20. Discussion, p. 20-23.

The Südbahn Agreement Between Austria and Italy. Agreement concerning a line in Northern Italy that has French shareholders and various claims against the Austrian Government for war service. American Review of Reviews, September, 1923, p. 326-327.

Letters to the Editor

[*The* RAILWAY AGE *welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about* 250 *words—are particularly appreciated. The editors do not hold themselves responsible for facts or opinions expressed.*]

The Unsatisfactory Crossing Whistle

INDIANAPOLIS, Ind.

TO THE EDITOR:

The highway-crossing whistle-signal continues to be a subject of considerable difference of opinion, and in view of the extreme conservatism of the American Railway Association in relation to train operating questions, it may be that a discussion of this rule in the columns of the *Railway Age* would be useful. The only point about this signal that is settled is that a large proportion of enginemen either do not know how to sound it properly or else are too lazy and neglectful of the rules even to try to do it as it should be done. I notice that Mr. Forman, who ought to be well informed in this matter if anybody is, proposes tentatively in your issue of August 25 that the present code signal might be changed to long, long, short, long. Whether or not this recommendation represents anyone's view but his own, I do not know; but evidently he thinks that the subject is worthy of attention. I for one should like to see the question aired a little, if only to try and produce a little improvement in the character of the whistling as it affects the comfort of passengers in trains. Any kind of change ought to result in improvement, for at present confusion reigns everywhere.

Enginemen seem to do just as they please. On some divithought of the rule. With rare exceptions, the best that can be expected of any engineman is that he will make the blasts long enough and loud enough. Any such idea as limiting the length, so as to avoid unnecessary annoyance to passengers, seems never to have entered anybody's mind.

What is the whistling for? I think the time has come when we may say that this whistle rule is little more than a legal form; for the automobile driver is very often so shut in by the walls of his car, or has his ears so engaged with the noises of his machine, that an audible warning is of but little use; he does not depend on the locomotive whistle at all. Under present conditions we may say that he *should* not. At any rate every thoughtful person must admit that the stop-look-and-listen rule is the only simple and adequate safeguard at crossings. This should be impressed on every driver on the highway, whether he drives an automobile, a horse or a snail; and in anything that I may say about the whistle, I desire to have it understood that I do not contemplate accepting any responsibility for saving the speed fool from his foolishness. The whistle rule, however, must be kept up, and as long as it is in force, it is a primary duty to carry it out in the simplest and most rational manner that can be devised.

Unnecessary whistling is a great nuisance, not merely in crowded cities, but everywhere.

From analogies derived from comparisons with other duties involving the forming of a habit, it is a fair conclusion that a short signal, repeated, is better than a long signal. Railroads that require the signal to be sounded for nine seconds almost continuously, thinking that they can halt the most careless auto driver, are wasting their energies. They must admit that at many crossings, all of the time, and at most crossings much of the time, a long whistle is a nuisance to everybody; everybody but the careless driver, who is so callous that he does not give it a thought. Every railway operating officer desires to abolish nuisances. He assumes probably that the nine-second signal is a nuisance, but a necessary one. Acting on this, he will try to mitigate it by prescribing short signals at as many places as he thinks it safe to do so; but in using such a halfway measure he only multiplies his own troubles, for he will have two or more standards to be prescribed, with corresponding teaching difficulty.

If a careless or absent-minded driver is approaching a crossing, a succession of short "7s" (— — - - — — - -) ought to arrest his attention as quickly as a nine-second blast; I should think more quickly.

If the regulation "7" blast (— — — - -) has any peculiar usefulness over and above a single blast, it is because, with it, wayfarers may have some desire to learn its peculiarity and its meaning, thus more surely fixing it in their memories; and a "7" made in two or three seconds certainly is easier to grasp than one composed of longer blasts. Every engineman must sound the whistle 80 rods before reaching a crossing where the signal is required. If there is special danger, or if he sees a careless autoist approaching, he must give a more effective warning; and the best and easiest way to do this is to repeat the signal already given, *as soon, or as many times,* as may seem necessary. With a succession of short sounds he is able, by the quickness with which he repeats the blasts, to give character to the warning. With very long blasts he cannot give to the warning any significant character; he only makes a great noise.

Why is it that there is so much variety in the whistle rules? As Mr. Forman has said, most roads do not enforce strict compliance with any whistle rule, and you may therefore feel like suppressing a wordy correspondent, on the ground that this question is an idle one; but at least we ought to *try* to have uniformity. Perhaps it may be possible to devise something that will be easier to enforce. On the Burlington and the Rock Island roads, I understand that signals are required to be repeated, as I have suggested; though I do not know the length of the initial signal or how uniformly the rule is obeyed. On the Chicago Great Western and the Chicago & North Western, the nine-second rule prevails, I believe.

Many roads leave everything to the judgment and discretion of the engineman. The Missouri-Kansas-Texas, as reported in the *Railway Age* of June 23, has made an intelligent effort to provide effective warnings. Some of its requirements seem ill-advised, having the appearance of having been put in just to make sure of covering everything; but it does recognize the principle that I have advocated, that is the repetition of a signal rather than a change of its character.

As before stated, I am thinking primarily of the passenger in the cars—he who rides in the front of the train and (in the case of thoughtless enginemen on other tracks who scare everybody by whistling as they pass passenger trains) all passengers. But it is proper to plead on general principles, in behalf of society; for, as has been often remarked, the automobile has made every part of the United States neighbor to every other part, and the least the railroads can do is to make this necessary nuisance as little a nuisance as possible, in all parts of the country.

This ought to be easy. If a competent small committee were to be employed to prescribe a proper whistle rule for, say, New Jersey or Wisconsin, there is no reason why all the rest of the country should not at once adopt the same rule.

D. ENGINEER.

Railway Progress in England and America

Newton Center, Mass.

To the Editor:

The American railroad man, whose interests are fairly broad, occasionally likes to look about him and note to what extent, if any, his methods have traveled beyond the confines of his own country. As this applies more particularly to motive power and rolling stock, perhaps a few observations along these lines will prove of interest.

Within recent years several of the locomotive types which originated in America have found favor in England. Curiously enough, most of these types were adopted only after their possibilities had been exhausted in the United States. I refer, in particular, to the Mogul, Consolidation and Ten Wheeler; referred to in England as the 2-6-0, 2-8-0 and 4-6-0, respectively. These designs lost favor here because of the difficulty of incorporating a firebox of adequate depth and width into any type without trailing wheels. That our overseas friends are beginning to realize this is evidenced by the fact that the Pacific type has taken a definite place in their scheme of progress.

There is one type, however, which made its appearance in England shortly after its introduction in America; this being, of course, the Atlantic. Early examples of the type in England, like their American contemporaries, had the old style firebox with long, narrow grate. When the wide firebox, of the style used on the New York Central and some other roads had proved its worth, the more progressive of the English lines adopted a similar contour; though, of course, on a smaller scale.

The Atlantic has enjoyed much popularity in England, though many examples of the 4-4-2 wheel arrangement over there do not conform to the accepted American standards. I refer, in particular, to those on the former North Eastern and Lancashire & Yorkshire railways. In both cases, the engines were so designed that the first pair of drivers is the main pair. The L. & Y. engines, which are still running, have inside cylinders, while the North Eastern engines have both inside and outside cylinders. Both designs have the old, long, narrow grate, and consequently, lack the steaming capacity of a more progressive style. There is some excuse for the L. & Y. engines, as they were built in 1899, but the North Eastern engines are of much more recent date. Fewer cylinders and larger grates would have been the correct prescription for the N. E. R. within recent years!

It is only fair to admit, however, that, on the average, English motive power practice shows marked improvement, and that future development promises to be along lines that are at least comprehensible to an American railroad man.

With reference to rolling stock. The big, outstanding feature is, of course, the increasing use of Pullman cars. These are, as might be expected, of a much Anglicized design. Nevertheless, they represent a distinct advance upon anything previously offered to the traveling public. They include the refinements of design commonly associated with "palace" cars prior to the steel car era and, without a doubt, present a very smart appearance, due to the effective color scheme of their exterior finish. On the other hand, they are rather light in construction; doubtless in order to keep trainloads down to a figure consistent with available motive power. That point of view seems to have deferred the use of all-steel cars in England. Rather short sighted as a policy, but possible in a naturally conservative country.

However that may be, it is a "far cry" from the absurd little six-wheel "carriages" once so common on through trains, to the 70-ft. coach now standard on the Great Western Railway.

The automatic coupler is slowly gaining favor, and there are various other details that make a good impression on an American traveler. What seems odd, though, is the fact that the club car has not yet gained a place in the make-up of Pullman trains. The baggage compartment in this type of car not only takes care of trunks, etc., but would make an ideal "hang-out" for the "guard," who usually likes a place at the head end. Certain of the Pullman trains are rather spoiled in appearance by the presence of an ugly little "van" next to the engine, which bears no resemblance to the other vehicles in the train, and looks totally out of place. In cases where much baggage must be cared for, it would seem that a baggage car, of a style to correspond with the Pullman cars should be adopted.

Looking at the situation in its broader aspects, it seems that American methods—such as increasing trainloads by the use of larger engines—provide the only means of putting the English railways on a more efficient basis. Clearly enough, the welfare of any civilized country is largely bound up in the financial stability of its railways. If this is so, then the sooner our overseas friends "get busy," the better for them and for us, since we have our own reasons for desiring the peace and security of the more important countries in Europe.

I cannot conclude without referring to an incident which gives point to all that I have said in the foregoing. It is nearly a quarter of a century since Mogul engines were introduced in England by American builders, at which time they were received with sniffs and sneezes. Probably few American railroad men recall the incident or could tell you anything about it. The younger generation of English railway men doubtless never heard of it. The facts are, however, that the English railways involved were the Great Northern and the Midland, and, if I am not mistaken, one other not so well known. The engines were built by Baldwin and Schenectady. By the time that people with short memories had forgotten the incident, the Great Northern was building numbers of Mogul engines, and now has no less than three classes of them. The Great Western has a small army of them, the old "Brighton" at least one class, and the old "Chatham" two classes. Most of these engines are simple, with alligator crossheads, and the familiar American style of cylinders with saddles. So that is that, as the saying is!

Would it be too much to hope that future improvements of American origin will gain their places without excessive sneezing as a preliminary? Arthur Curran.

The Conical Bottom Tank for Water Treatment

Huntington, W. Va.

To the Editor:

The article on the water treatment program of the Illinois Central by C. R. Knowles, which appeared on page 213 of the *Railway Age* of August 4, is of interest to those handling railway water supply problems. The development of the conical bottom tank for use in connection with treating plants is of special interest. However, it is felt that the enthusiasm over the new tanks has resulted in considerable exaggeration in the statements relative to the saving in the amount of water required for sludging. My experience in connection with sludge removal in flat bottom tanks in railway water softening service indicates that a satisfactory removal may be obtained by using approximately one-half a foot of water on each eight-hour shift. This means a consumption per shift of 1,500 gal. for tanks having a diameter of 24 ft. and 2,500 gal. for tanks having a diameter of 30 ft., which is considerably below the estimate advanced in the article.

It is also very probable that the "low rate of 15 cents per

1,000 gal.," used as the basis for determining the saving made is high. The cost for water used in sludge removal purposes can hardly be taken at the entire unit cost of the water supply as the additional expense incurred only involves additional power required for pumping the water and does not affect the overhead charges. It is also difficult to perceive what the advantage is in leaving the bottom portion of the water treating tank as useless air space when at less cost the straight sides of the tank can be continued to ground foundation and this space utilized for water storage and sedimentation purposes. However, there are undoubtedly possibilities in this new development, particularly with reference to sludge removal and the subject will be studied with considerable interest.

R. C. BARDWELL,
Superintendent Water Supply, Chesapeake & Ohio.

Time and Money

CINCINNATI, Ohio.

TO THE EDITOR:

Reading your editorial note of August 25, on the art of train operation, and noting its emphasis on the fact that the best things in Mr. Forman's article are not new, I took your advice, and went back over all of the three articles; and, indeed, they are "old stuff," and no mistake. I recall experiences in "the art of railroading," many years ago, which were exact parallels to what is here described. But is that any reason for not taking notice of the situation as it is today? Is it to be taken as a discouragement? Not by any means. Telling things that are already known, but not known well enough, is a never-ending duty resting not only on railroad officers but on leaders in many and varied lines of endeavor.

Four-fifths of your men—at any rate four-fifths of those who have been with you for as long as five years—already know what Mr. Forman tells them, and know pretty well what they ought to do; the question is, how can they be spurred to more intelligent and persistent effort? More inspectors and more pep in every inspector, is one way of phrasing the answer. You will say, no doubt, that I, too, am dealing in "old stuff," and you may perhaps ask me to take a back seat; but there is one element in the problem which is sufficiently unfamiliar to pass for a new one, namely, that building up a first-class force of trainmen takes much time and money; more than has ever been devoted to the task except in rare cases.

Compare with any other business requiring a similar degree of character and ability in the men. Mr. Forman intimates that ordinary conductors, enginemen and station agents can be made into competent inspectors. Very well; try it. But everybody seems to be willing to follow the old plan of expecting these men to educate themselves. They will not do it (except in rare instances) without a bigger incentive. A young man in a manufacturing business, desiring to educate himself to be a traveling salesman, has for an incentive the hope of getting a salary two, three or five times what he is getting. With this before his eyes he aims strenuously to fit himself for the hoped-for job.

The railroad superintendent who desires to have bright and energetic assistants must provide something parallel to this. To do this he must add a large percentage to his cost of personnel; but does anybody deny what I am saying? You may find it difficult to discover a superintendent who dares to increase salaries of trainmasters or other inspectors 50 per cent; but there is the principle; what else can you do?

Is there a notably smart and successful trainmaster among the readers of the *Railway Age*? Let us hear what sort of air castles he builds. Somebody has got to do more castle-building if we are to have any marked improvement in character-building among trainmen. Suppose you offer a prize of $100, not for a "paper" or an essay, but for the best and most instructive record, from a trainmaster, of his conduct of his office for a year; say the year ending October 1, 1924. I say the best "record," not the best results. It may be that a record including some failures, and a good deal of less-than-100-per cent efficiency, would prove illuminating.

I said improvement would take time. The date that I have just given suggests this. There is another aspect of the time element; the everyday tasks take much time. Mr. Forman refers to Abraham Lincoln's use of stories; that may seem a slow way; but if it is sure, let us take notice of it.

We spend an hour giving instructions to a freight conductor and then he, with the railroad's lawyer, may spend a whole day in court explaining some feature of train operation which has become involved in a lawsuit. The seemingly extravagant expenditures of time and money by railroad legal departments may perhaps be worthy of the trainmaster's attention.

Every experienced superintendent can recall long interviews with conductors and enginemen—deemed necessary as educational measures—which would be quite costly if measured in money; but it is pertinent to suggest that there ought to be many more such interviews, rather than fewer.

An important thing for every trainmaster is to get in sympathy with his men; and this can only be done by getting on a level with them. This does not mean dropping down and confining your attention to the things which engaged your energies before you were promoted. You are required now to work on a higher level! Do not forget this. The most common way in which a trainmaster disappoints the officer who promoted him is in spending too much thought on things connected with his former job. To get on a level with subordinates means frequent breaking of the ice which separates the management from them. One of the most useful ways to do this is to own up to your mistakes, as Mr. Forman says. Do the job thoroughly; do it in public! If you are too uniformly perfect it might be well to introduce a few imaginary or constructive mistakes, rather than go on forever expecting good relations with men who do not know how to be frank with you.

We must cease fooling ourselves with the notion that the hope of promotion will provide all needed incentive to make men strive to perfect themselves. Except with very bright men this motive is too vague; the hope is too distant.

There is no use in mourning over college graduates' lack of interest in railroad work. All of the propositions for stimulating their ambition to become freight-clerks or train despatchers will be futile, except as some big institution—a railroad, or a state, or a university—shall provide a scheme *which can be seen to be permanent*, and which is accompanied by guaranties, somewhat like army service.

As I write, the *Railway Age* of September 1 comes to hand; and I see that you, on page 371, have written three lines that will perhaps be more useful than my whole column; I refer to the suggestion which you make, to high railway officers, to see to the improvement of ticket sellers. I will take the liberty of re-writing that sentence in the terms that I have just been discussing: Appropriate more time and money to ticket offices. The inspector of offices must spend more time in educating. The ticket agent himself must have more time to polish up his arts of diplomacy. What a large proportion of ticket sellers are over-worked! I do not need to add that all these arguments apply equally well to matters affecting the safety of trains. In switching off from freight conductors to ticket sellers, I am not taking any wrong track.

VETERAN.

One of the Larger Under Crossings—Springfield Avenue at Ampere, N. J.

Train Operation Improved by Grade Separation

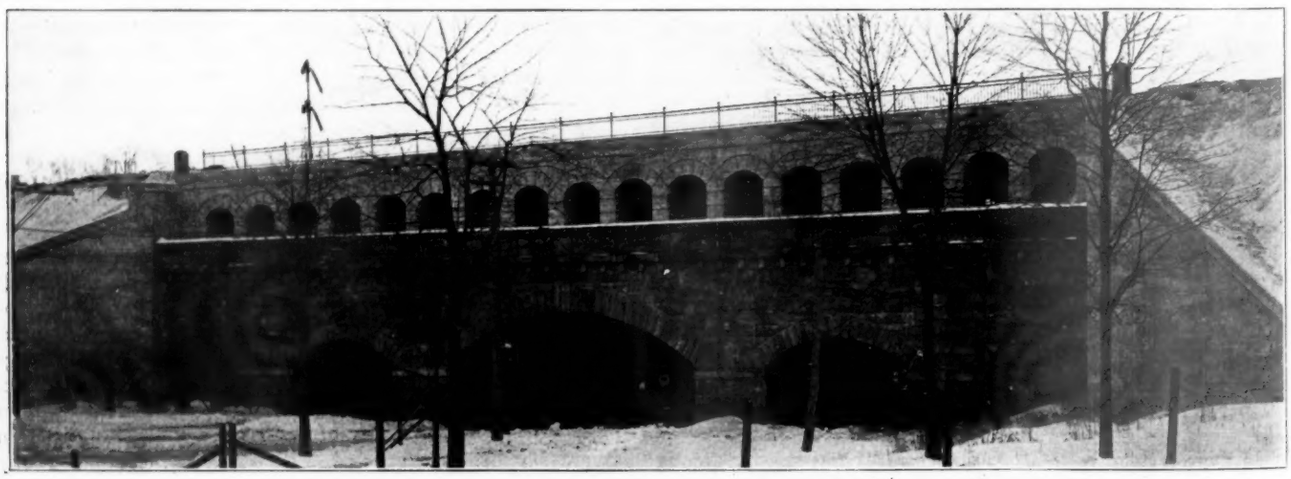
Completion of East Orange Work Gives Lackawanna Three Tracks Through Suburban Territory

THE DELAWARE, LACKAWANNA & WESTERN has recently placed in full operation its new track elevation project through East Orange, N. J., thus completing the final link of a long continued and thorough grade separation program in that road's suburban territory. The work which has been under way at East Orange for the past two years, involves about 1½ miles of line which was previously double track, connecting at either end with three-track lines. It also involved a short section of line in the vicinity of Ampere, N. J., on the Montclair branch. With the completion of this work, the Lackawanna secures three tracks through the densest part of its suburban territory, one of which is reversible at all times. As a consequence, it has been possible to cut from five to six minutes from suburban express train schedules, to add two additional trains and to provide some increased capacity for the future. All structures have been designed for possible future electrification.

In more detail, the East Orange work, as it is more commonly referred to, consists of the elimination of 11 grade crossings by elevation, the revising and reconstruction of numerous streets, the building of two new passenger stations and the reconstruction of a third, the addition of a third main or express track, and some 1,700 ft. of reinforced flat slab construction in the form of two viaducts. On the Ampere line, three grade crossings have been eliminated in addition to the raising and reconstruction of the Ampere station and platforms.

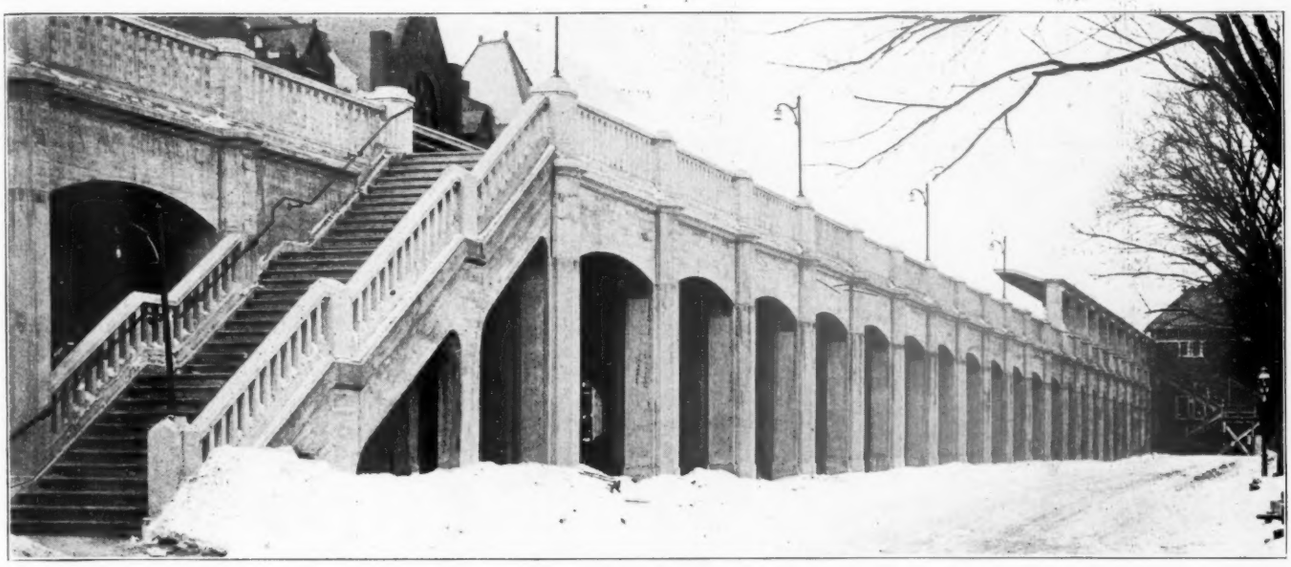
Completion of Long Time Grade Separation Program

For a long period previous to the war, the Lackawanna had carried forward a grade separation project which gave that line three tracks through Newark, N. J., on the east of the present work and three tracks west from Orange, N. J., to Millburn, about 17 miles. Similarly considerable work had been completed on the Montclair branch, approximately four miles long consisting chiefly of grade crossing elimination in and near the town of Montclair and through the Bloomfield and Watsessing stations. Partly because of the war, but chiefly because of a lack of agreement between the town of East Orange and the railroad, the completion



East Orange Parkway—the Concrete Work Harmonizes Well with the Old Arches

of the remainder of this project was held in abeyance until 1921 when an agreement was reached. Originally the town held out for grade separation in the form of depressed tracks, a consummation which was almost physically impossible because of the problems of heavy grades, inadequate drainage, clearance of structures, etc. In addition, any future expansion in the number of tracks would be badly handicapped. It was, therefore, agreed to elevate the tracks through this section, connecting up the depressed tracks through Newark on the east and the tracks already elevated through Orange on the west. The inauguration of this East Orange work and some of the problems which had to be met were described on page 281 of the August 13, 1921, issue of the *Railway Age*.

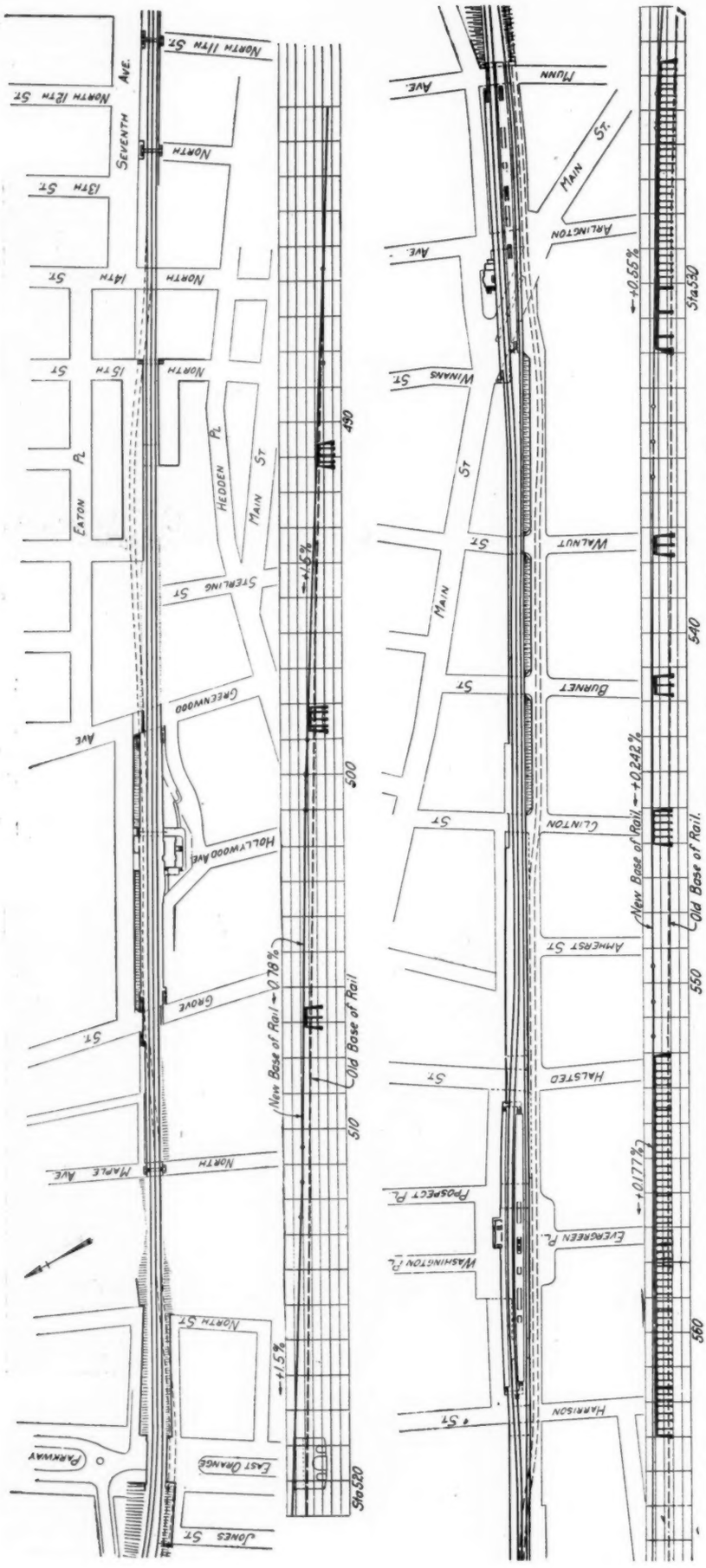


One End of the East Orange Viaduct Where Fascia Columns Were Used

With the completion of the project, the Lackawanna has three tracks, one of which (the center) is reversible at all times for the entire distance from Hoboken to Millburn, with the exception of the Bergen tunnels where there are four tracks and over the Hackensack and Passaic rivers where there are double-track bridges, one for each river crossing, both tracks at these points being reversible at all times. The line is fully signalled, using the five-position color light indications described in connection with the third tracking across the Hackensack Meadows on pages 785 and 1,185 of the October 28 and December 23, 1922, issues respectively of the *Railway Age*. Because of this trackage and signal arrangement the road is able to handle its express suburban traffic more efficiently, the inner or No. 1 track and the westbound main being used interchangeably between Newark and Roseville Avenue, between Roseville Avenue and Orange and between Orange and Millburn for outward or homebound commuter trains, the eastbound main serving the light inbound movement. In the mornings when the heavy traffic is eastbound, the eastbound main and the center or No. 1 main are used in the reverse arrangement.

The Brick Church Viaduct; Note the Difference Between It and the East Orange Viaduct

A brief summary of some of the train movements during the westward rush-hour traffic is of distinct interest and in addition necessary to show the operating effect of this through track and grade separation. Four trains are scheduled to leave Hoboken at 4:15 p. m. (5:15 p. m. daylight saving time). The first, No. 241, is a Montclair train stopping at



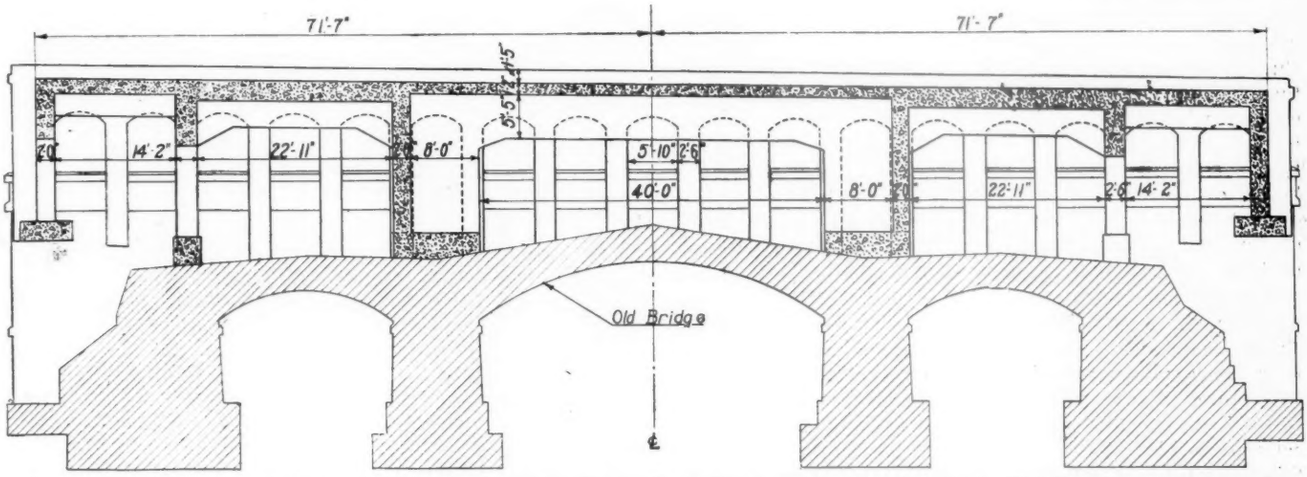
Grade Profile and Track Layout of Track Elevation Work West of East Orange Parkway.

Newark at 4:28 and at Roseville avenue at 4:33, branching off at the latter point to the Montclair branch. It operates over No. 3 track between Newark and Roseville. The second 4:15, No. 277, makes no stops until Summit, N. J., is reached, 20 miles out; it operates over No. 1 track from Newark through to Millburn and passes No. 241 on No. 3 track at Roseville avenue. The third 4:15, No. 339, is a Gladstone express stopping at Newark at 4:32 and then running express to Summit where it branches off on the Passaic & Delaware branch. This train follows No. 241 into Newark and operates over No. 3 track from Newark to Roseville avenue where it is diverted to No. 1 track, running through on this track about four minutes behind No. 277 which is also on No. 1 track. The fourth 4:15, No. 231, is a South Orange "accommodation" stopping at Harrison, an industrial center east of the outskirts of Newark at 4:32. It does not stop, however, at Newark or Roseville avenue, but operates over No. 1 track between these points being diverted to No. 3 track at the latter point from which it makes all seven stops in the Oranges, ending its run at South Orange.

These four 4:15 trains are next followed by a 4:22, a 4:25 and a 4:30 which in connection with No. 231, the fourth 4:15 train, illustrate an interesting run-around movement. The 4:22 or Morristown train, No. 337, stops at Newark at 4:37, two minutes after No. 231's passing time, operates over No. 3 track between Newark and Roseville, is diverted to No. 1 track at the latter point and runs around No. 231 between Roseville avenue and Orange where it is diverted back to No. 3 track to make its scheduled stops from South Orange to Morristown. In the meantime No. 233, a Millburn train, leaves at 4:25, is due at Roseville avenue at 4:43, four minutes behind No. 231 and operates over No. 3 track between Newark and Millburn, its terminus. No. 381, a Dover train follows the 4:25, leaving at 4:30 and operating over No. 1 track Newark to Millburn. Thus in this three-track section in the course of a comparatively few minutes No. 381 first passes No. 233 and next No. 231 both of which are on No. 3 track between Roseville avenue and Orange, and then between Orange and Millburn passes No. 337 which was diverted from No. 3 track to No. 1 and back to No. 3 to run around No. 231 between Roseville avenue and Orange. A somewhat similar grouping of train movements occur during the inbound morning rush hour traffic.

There are three station stops within the limits of the East Orange project, known as Grove street, East Orange and Brick Church. Through Newark the line is carried in a depression from which it emerges slightly west of Roseville

avenue. In order to secure sufficient elevation of the line and to obviate too great a depression of the streets on the east end of the work, a 1.5 per cent grade was utilized, starting from a point about 200 ft. east of the Newark-East Orange city line and continuing for about 1,200 ft., changing to 0.78 per cent through the Grove Street station. It then reverts to 1.5 per cent which is continued to the East Orange station where the grade is 0.55 per cent. From this point the line continues to ascend on grades of 0.242 per cent and 0.197 per cent through the Brick Church station, reaching



Longitudinal Section of the Parkway Arch Showing How the Raise in Grade Was Effected. Reinforcement Not Shown

level grade at the connection with the previously elevated line through the city of Orange. This has resulted in an approximate maximum elevation of 20 ft. over the grades of the old double track line.

Street Changes Form an Important Factor

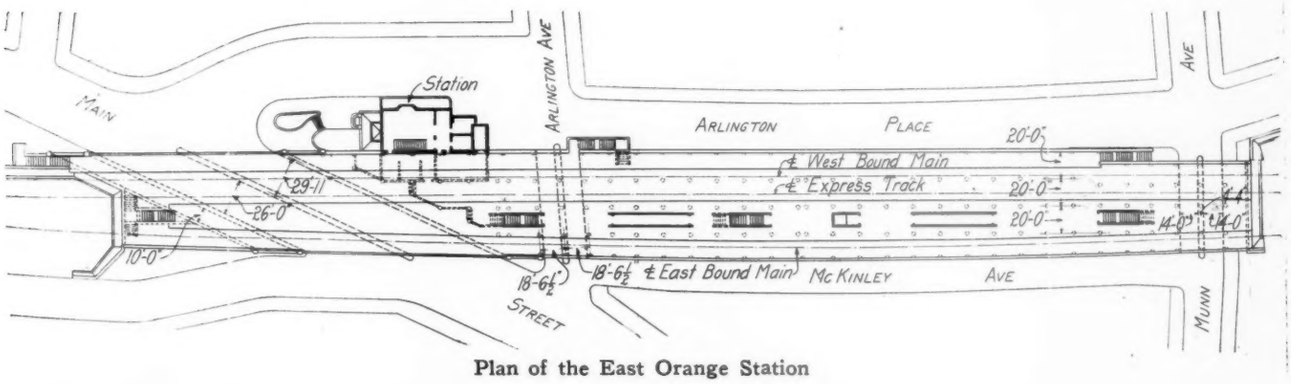
Altogether 14 street crossings are affected directly by this project, one of which, namely, East Orange Parkway passed naturally under the old grade because of topographical conditions. Of the remaining 13 streets, two were practically consolidated into one street and carried under the tracks by a subway, five more were handled by independent structures and the other six handled as parts of the elevated station and platform structures at East Orange and Brick Church.

The carrying out of this grade separation involved considerable changes in street grades as well as the construction of several entirely new streets. As an indication of the magnitude of this phase of the work, the alterations made in the vicinity of Grove Street station are of interest. At this point the work includes changes in the grades of Grove street, Eaton Place (a street paralleling the tracks), Greenwood avenue and the approaches to the station between Greenwood avenue and Hollywood avenue, a total of about 2,400 lineal feet. Another change in the vicinity consists of the construction of an entirely new street paralleling the railway on the north side and connecting North Fifteenth and Seventeenth streets. This street will have descending grades of from four to five per cent from the ends to the center where it is carried under the tracks along the extended line of North Sixteenth street (not a through street at present) where it swings to the east over another new street to connect with North Fifteenth street on the south of the tracks. A concrete subway is provided for pedestrians at North Fifteenth street.

The greater part of the elevation through East Orange is on a fill between concrete retaining walls. The more difficult work consisted, however, of the construction of two new stations with 800 to 1,000 ft. reinforced flat slab viaducts at East Orange and Brick Church. At these locations, artistic structures were erected as a part of the viaducts, while at Grove street, the remaining stop in this section, a pleasing arrangement was secured by some reconstruction and some new construction.

Two Treatments of Flat Slab Viaduct Construction

The design of the flat slab viaducts was practically the same as that used previously at South Orange and Buffalo.



Plan of the East Orange Station

The viaduct at Brick Church is a reinforced concrete structure, 1,085 ft. long by approximately 75 ft. wide, supported upon four longitudinal lines of columns (except at the ends where but three lines are used), spaced 20 ft. c. to c. longitudinally and 21 ft. c. to c. transversely. The outer rows of columns are set back from each face of the viaduct, giving cantilevers of 7 ft. 2 in. and 7 ft. 5½ in., in variance

to the design of the East Orange viaduct where fascia columns are used. The use of cantilever construction at Brick Church was necessary to secure sufficient approach and driveway areas without the purchase of additional property.

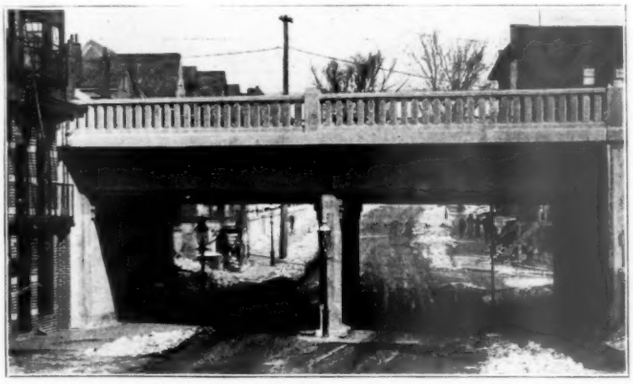
In contra-distinction to the Brick Church layout, which is practically one single form of construction throughout, the East Orange viaduct consists of three different types, brought about by the crossing of Main street on a sharp skew of 65 deg. This skew, in connection with the width needed between curbs of 26 ft. for each driveway, precluded the possibility of flat slab construction for the support of the tracks and platforms. Furthermore the angle of the crossing created a triangular section on one end which, because of its shape, necessitated some form of construction other than that of the main section of the viaduct. For the Main street crossing where it was desired to secure the required minimum overhead clearance of 14 ft. without increasing grades, a floor construction was used which consisted of 30-in. girder beams on spacings of from two to five feet, filled in with concrete to give a total floor depth of three feet or three inches of concrete above and below the steel beams. The fascia girders were painted a concrete color to harmonize with the rest of the structure.

The main section is of reinforced flat slab construction similar to that at Brick Church with the chief exception that fascia columns are used instead of the cantilever treatment. It is supported on five lines of columns spaced normally 21 ft. 4 in. center to center. Transversely the spacing of columns is chiefly 20 ft. center to center with deviations from this to take care of the curvature introduced by the eastbound main and the island platform and for a stairway at Munn avenue. At both Brick Church and East Orange, the eastbound main and the express track will be served by island platforms with separate platforms for the westbound main along the north side of the structures. To provide for future possible electrification, the design included sufficient platform clearances for third-rail installation and in addition foundation supports for catenary construction so that either type of electric current conduction can be handled without disturbance to the structures themselves.

A part of the space underneath the platforms, which are covered for a portion of their length by canopies, is utilized for additional station facilities such as waiting rooms, ticket offices, etc., and parking space for cars. The island platforms and the waiting rooms are connected with the facilities on the lower level by stairways through the slab structures, thus obviating any necessity for the incoming or outgoing passengers to cross the tracks at grade.

Novel Construction at East Orange Parkway

A somewhat unusual problem and solution was encountered in the crossing at East Orange Parkway where the old line was carried over the drive by three masonry arches about 11 ft. below the grade of the new tracks. To obviate the greatly increased and possibly dangerous stresses which filling in would induce and to avoid excessive expenditures and hindrances to train operation attendant on the removal of the arches and the construction of a new structure, an open structure was designed and constructed.



Grove St.—One of the Points Involving a Considerable Change in Street Grades

The old structure consisted of three masonry arches of 20 ft., 40 ft., and 20 ft. clear spans with intermediate masonry piers 10 ft. thick. In the open construction, reinforced concrete T-beams with a stem thickness of 2 ft. 6 in. were utilized for the main spans with a spacing of 6 ft. 6 in. transversely. These beams were carried on concrete piers of the same thickness as the stem of the beams and of a width equal to that of the masonry piers upon which they rest. In

Building the Skew Crossing at Main Street, East Orange

addition, the piers are tied together at the outer ends by a 2-ft. cross wall which also serves as one of the supports for the two-way slab construction of the adjacent span which extends slightly back of the face of the abutment. Two-way slab construction supported by a combination of concrete girder and column construction was used over the masonry abutments, resulting in a structure on which the loading was but little in excess of that under the old condition. The fascia girders were poured in a series of 17 uniform arches, the piers and arch rings being scored to secure an effect harmonious with the masonry structure.

The independent undercrossings follow the same general design that has been utilized along the Lackawanna at a wide variety of points for crossing elimination. These structures consist in brief of reinforced concrete slabs for bridge floors, supported by centrally located concrete piers and abutments. In some installations, they are supported by rows of

An Attractive Structure Was Erected at the Brick Church Station

piers or columns along the curb line in addition to the other. The parapets are made integral with the slabs and where the crossing is skewed slightly, they are reinforced to act as girders. A minimum clear opening of 16 ft. 6 in. is maintained between the center pier and the curb lines.

In carrying out this work, it was in reality divided into two sections, East Orange Parkway being the practical dividing line. Temporary tracks were laid over the greater part of the distance but at some points, notably west of the Grove street station, the raise to the new grade was made under traffic. The problem west of East Orange Parkway was rendered more simple by the construction of a double-track temporary line along an adjoining street and some purchased right-of-way. Brick Church and East Orange stops were consolidated into one at a temporary station. With the traffic thus detoured around the major part of the work, the necessary concrete construction could be pushed rapidly.

The design and construction of this improvement at East Orange was carried out under the direction of G. J. Ray, chief engineer of the Delaware, Lackawanna & Western; M. H. Doughty, division engineer; M. Hirschthal, concrete engineer; F. J. Nies, architect; A. E. Deal, bridge engineer; and O. H. Kellogg, assistant engineer, in direct charge of the work. The contractors on the work were the F. M. Talbot Company, H. F. Curtis and the Hyde-McFarlin-Burke Company.

MISSOURI PACIFIC EMPLOYEES at St. Louis, Mo., and at Omaha, Nebraska, have organized Missouri Pacific booster clubs for the purpose of promoting better relations between the employees and for improving service to patrons.

Tool Foremen Conclude Meeting

ONE OF THE FEATURES of the American Railway Tool Foremen's Association convention, a partial report of which was given on page 398 of the *Railway Age* of September 1, was an address by H. T. Bentley, superintendent of motor power and machinery of the Chicago & North Western. This address was delivered on the second day of the convention. Mr. Bentley spoke in part as follows:

H. F. Bentley's Address

I am a great believer in conventions of this character and know that if you come together and actually give your members the benefit of your knowledge it will be very helpful. It is rather peculiar that a man who will tell all he knows to his fellow workmen when in the shops, on the street, or at home, is very often silent at a convention when he really ought to get up and tell of the experiences he has had relative to the subject under discussion. If he would tell how he has overcome some particularly difficult problem, that would be of great interest and help to his fellows.

As I have been intimately in touch with mechanics all of my working life it has taught me to be able to pick out a good one, and how easy it is to get that kind of a man to understand what you want done. It is difficult to get results with a man who does not understand his business, and it hurts the eyes to see how some men handle their jobs. A good workman or foreman is an artist, just as much as a musician is a master of the instrument he plays. On the other hand, the poor workman or foreman brings discord just as much as a man does who tries to play an instrument and doesn't know how.

With the large number of good technical magazines and books now available to anybody who wants them, there is no good excuse for ignorance of what is going on in our line of work and benefiting thereby. The opportunities offered at a convention like this to see exhibits and meet the experts who are promoting their use is an education in itself and one that we should take advantage of.

Thoroughness in our work is what counts. I presume you have all read that part of the Good Book in which occurs the following: "Whatsoever thy hand findeth to do, do it with all thy might," from which you will see that even in biblical times it was known that haphazard methods were not satisfactory, and if you started on a job it should be done in the best manner possible.

There is one thing I would like to talk to you about for a few minutes, and that is the necessity of being a booster. The railroads have had and are still having an uphill battle to fight with adverse legislation and demagogues who are very strong with their mouths but weak with their muscles. It is necessary for all of us to acquaint ourselves with the facts pertaining to the railroads in general and our own in particular, so that when we meet people who are long on promise and short on performance we can call them and give them something to think about.

We all know that when the railroads are prosperous the country as a whole is benefited, for purchases made to keep locomotives and cars in order, buy fuel and pay wages, act as a stimulus to all industries through the distribution of the vast amount of money necessary properly to maintain adequate and satisfactory service.

You have noticed in your own shops where new and improved tools and machines would be of assistance in getting out a large amount of work and at less cost if you could get them. Every law that is passed or action taken preventing the railroads from earning a reasonable return on their investment makes it so much more difficult for us to get the things we need in our shops.

We must not forget that all foremen in railroad shops have

important positions with responsibility not only to the company they work for but also to the men under them. Unless a foreman is fair to his men he cannot get their respect. On the other hand, he must insist on a proper amount of work being done for the wages paid.

The use of poor tools in most cases means poor output and it is therefore necessary for you to keep them in shape so that maximum results will be obtained.

Election of the Officers

Following the presentation and discussion of technical papers the association took up several matters of business routine on the afternoon of the third day and then proceeded to the election of officers. The following officers were elected for the ensuing year: President, G. W. Smith (C. & O.), Huntington, W. Va.; first vice-president, Chas. Helm (C. M. & St. P.), Milwaukee, Wis.; second vice-president, George Tothill (B. R. & P.), Du Bois, Pa.; third vice-president, E. A. Hildebrandt (C. C. C. & St. L.), Beach Grove, Ind.; secretary-treasurer, W. B. Stevenson (A. C. L.), Rocky Mount, N. C.; assistant secretary-treasurer, J. A. Duca (C. R. I. & P.), Shawnee, Okla.

Exhibitors

Forty-six supply companies had representative exhibits of machines, tools and supplies. These companies, together with a list of their products and representatives, were as follows:

Air Reduction Sales Company, New York—Oxygen and acetylene welding and cutting apparatus. Represented by G. M. Calmback, A. B. Brown and B. N. Law.

American Machinist, New York—Copies of American Machinist. Represented by William Conley and W. V. Wallace.

American Twist Drill Company, Detroit, Mich.—High-speed twist drills. Represented by E. N. Gripton and F. E. Henderson

Argyle Railway Supply Company, Chicago—Argyle Titan electric drill. Represented by A. H. Green and W. P. Whitfield.

Armstrong Bros. Tool Company, Chicago—Tool holders, ratchet drills, dogs, clamps, wrenches, stocks, dies and pipe vises. Represented by Paul L. Armstrong and John Sutton.

The Ashton Valve Company, Boston, Mass.—Wheel press recording gage, dead weight tester, driving wheel quartering gage, inspectors testing and proving outfit, quadruplex air brake gage, double dial steam gage, safety valves, protected dial pressure gage and steam gage. Represented by Charles Gaston and J. F. Gettrust.

Charles H. Besly & Company, Chicago—Taps, disc grinders and discs. Represented by Arthur C. Wolfrum.

The Borden Company, Warren, Ohio—Pipe threading tools, special die stock for threading air lines and superheater stock. Represented by V. M. Gaspar.

Brown & Sharpe, Providence, R. I.—Precision tools, machinist tools and various lines of milling cutters. Represented by Tom Sprigings, W. A. Weatherhead and P. A. Topel.

W. L. Brubaker & Bros., Millersburg, Pa.—Spiral fluted taps, locomotive reamers and general line of taps. Represented by Fred M. Bettes.

Chicago Pneumatic Tool Company, New York—Represented by J. M. Stayman, J. D. Crowley, Norman Thulin, E. K. Lynch and J. L. Rowe.

Clark Equipment Company, Buchanan, Mich.—High-speed twist drills, reamers, countersinks, flue cutters and lathe tools. Represented by C. O. Montague and W. Nochumson.

The Cleveland Pneumatic Tool Company, Cleveland, Ohio—Represented by C. J. Albert.

The Cleveland Steel Tool Company, Cleveland, Ohio—Punches, dies, rivet sets and chisel blanks Represented by Harry W. Leighton.

Cleveland Twist Drill Company, Cleveland, Ohio—High-speed drills and reamers. Represented by H. S. White, O. B. Hansen, W. L. Evans and I. P. Farnun.

Crucible Steel Company of America, Pittsburgh, Pa.—Represented by F. Baskerfield.

The Desmond-Stephan Manufacturing Company, Urbana, Ohio—Grinding wheel dressers and commercial diamond truing tool. Represented by H. A. Williams.

Detroit Twist Drill Company, Detroit, Mich.—Twist drills, reamers, milling cutters, chucks, arbors, combined drills and countersinks, sleeves and drift pins. Represented by R. D. Winslow and W. M. Petrie.

Duff Manufacturing Company, Pittsburgh, Pa.—High-speed ball-bearing jacks. Represented by Earl Thulin and C. Thulin.

J. Faessler Manufacturing Company, Moberly, Mo.—Boiler makers' tools, flue expanders, fine cutters and flue rollers. Represented by G. R. Maupin.

Federal Machinery Sales Company, Chicago—Geometric threading tools. Represented by H. H. Fasnacht.

Gammons-Holman Company, Manchester, Conn.—Spiral taper reamers, hand expansion reamers, end mills and chucking reamers. Represented by T. F. Grady.

Goddard & Goddard Company, Detroit, Mich.—Milling cutters and reamers. Represented by C. H. Wallace and C. S. Goddard.

Greene, Tweed Company, New York—Reversible ratchet wrench. Represented by V. B. Nickerson.

Independent Pneumatic Tool Company, Chicago—Represented by O. T. Cruice, A. H. Dallman, W. A. Nugent, R. C. Cooper and A. Anderson.

Ingersoll Rand Company, New York—Represented by L. W. Schnitzer, L. J Ahlberg and W. S. Morehouse.

E. S. Jackson & Company, Chicago—Firth-Sterling tool steel. Represented by L. E. Tegardine and E. T. Jackson.

William H. Keller, Inc., Grand Haven, Mich.—Riveting hammers, shipping hammers, drills and parts. Represented by M. J. O'Connor, William H. Keller and J. V. Conway.

King Pneumatic Tool Company, Chicago—Riveting and chipping hammers. Ball type throttle valve interchangeable with piston type throttle valve hammers. Represented by W. M. Hankey.

Larco Wrench & Manufacturing Company, Chicago—Pipe wrenches in various sizes. Represented by W. W. Miller.

Lovejoy Tool Works, Chicago—Roller and spring expanders, flaring tools, staybolt sets, sleeves, beading tool retainers and journal jack. Represented by W. H. Dangel and Tom Brown.

McCrosky Tool Corp., Meadville, Pa.—Reamers, quick change chucks, turrets, steady rests and geometric hex cutting tool. Represented by T. F. Grady.

Murchey Machine & Tool Company, Detroit, Mich.—Collapsible taps and die heads. Represented by T. F. Grady.

Norton Company, Worcester, Mass.—Norton grinding wheels. Represented by G. W. Thompson and H. K. Clark.

Pratt & Whitney Company, New York—Hand taps, boiler taps, mud and washout plug taps, locomotive reamers, expansion reamers, punches and dies, milling cutters, ratchet wrenches, die stock sets, metal saws, gear cutters, bridge reamers and curvex cutters. Represented by F. A. Armstrong and P. C. Renno.

Racine Tool & Machine Company, Racine, Wis.—Metal cutting machines. Represented by J. M. Jones, M. E. Erskine and R. E. Fuller.

Railway Journal, Chicago—Copies of Railway Journal. Represented by E. C. Cook and Walter H. Bentley.

Railway Age, New York—Copies of *Railway Age* and Railway Mechanical Engineer. Represented by E. L. Woodward, J. M. Rutherford and B. J. Wilson.

Rigid Tool Holder Company, Washington, D. C.—Turning tool, back-stroke cutting off tool, adjustable boring tool, double reversible boring tool, single reversible boring tool, short-hold boring tool, duble-angle external thread tool and spring tool for internal threads. Represented by E. F. Gibbs.

Simonds Saw & Steel Company, Fitchburg, Mass.—Metal cutting saws and knives, files and high-speed steel tool holder bits. Represented by George Bird.

The Standard Tool Company, Cleveland, Ohio—Drills, reamers, taps, milling cutters and high-speed drill which is first forged and then afterwards milled so that it has the same accuracy as a mill drill. Represented by Frank C. Selzer and R. A. McKay.

R. R. Street & Co., Chicago—Horton Chucks, Hyatt roller bearings, Keystone steel split pulleys, Jackson time-saving devices and Limestone motor pulleys. Represented by A. H. Taylor and Charles J. Butterfuss.

Vanadium Alloys Steel Company, Latrobe, Pa.—Axle turning tools, wheel turning tools, gripper dies and miscellaneous assortment of tool steels. Represented by W. R. Mau.

The Van Dorn Electrical Tool Company, Cleveland, Ohio—Portable electric drills, reamers, grinders, tool post grinders, floor grinders and bench drilling stands. Represented by Harry W. Leighton.

Whitman & Barnes Manufacturing Company, Akron, Ohio—Drills, reamers and track bits. Represented by E. W. Thompson and M. J. Kearns.

Wilmarth & Morman Company, Grand Rapids, Mich.—Drill grinders, surface grinders, universal tool and cutter grinders. Represented by A. Williams and H. L. Saunders.

P. & A.

Locomotive Moving Brick Yard Office at the Baltimore & Ohio Eckington Yards, Washington, D. C.

I. C. C. Statistics and Operating Efficiency

The O. S. Reports—Suggestions as to the Proper Use of the Data Reported—Caution Needed in Comparing Roads

By J. E. Slater

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UP TO THE time of the Railroad Administration, the Interstate Commerce Commission did not require currently any information as to operating performance. While the annual report did require information as to train load, car load, number of cars per train, and other similar information as to both freight and passenger service, this information was, to a considerable extent, incidental. It was not the primary reason for the report and there was no intention of covering all phases of operation. Under federal control, a set of reports was instituted primarily to analyze the efficiency of operation. This step, which was the first in the way of standardized statistics of freight train and passenger train performance, constituted a great step in the development of railroad statistics. At the end of federal control, the Interstate Commerce Commission instituted the present O. S. (operating statistics) forms which are largely a condensation of the old forms. These statistics now being required are available to the public, and it is to be expected that more rather than less use will be made of them by the public, as well as by the commission and the railroads, in checking and comparing operating efficiency. It is important, therefore, that certain fundamental facts with reference to these statistics should be known and that care be taken that erroneous and fallacious conclusions should not be derived from statistics which, in themselves, are useful and valuable.

In the first place, it should be borne in mind that the O. S. reports do not furnish information covering all of the important factors of performance. They are devoted primarily to an analysis of train, locomotive and car efficiency. There is no reference to station or yard performance or expense. The reports of the Railroad Administration formerly showed the switching locomotive-miles and information as to fuel consumption of switching locomotives and the miles per locomotive per day. Even this is omitted in the present form. This is not mentioned in criticism of the present form of the O. S. reports. It is recognized that the statistics of station and yard performance have not been standardized and do not lend themselves to standardization to the same extent as do the statistics of train operation. This is doubtless the chief reason that such unit figures have not been included. Nevertheless, this fact is of importance and should not be forgotten when conclusions are drawn as to operating efficiency. While fairly complete data is available covering one important aspect of transportation, the terminal situation is not reflected, nor can conclusions be drawn as to the efficiency with which the terminal situation is handled from any of the figures shown.

OS-A—Freight Service Performance

OS-A, which is the analysis of the freight service performance, may be divided roughly into three parts; first, freight train performance; second, car performance, and third, locomotive performance. Under freight train performance are included the statistics of train miles, gross and net ton-miles, train-hours, train-load, cars per train, train-speed, gross and net ton-miles per train-hour.

The train-load is widely used as an index of all-around operating efficiency, and more publicity and comment is made upon this unit than on any other with the possible exception of miles per car per day. There is no attempt to deprecate the use of the train-load as *an* index of operating efficiency. It is an essential element in the checking of train performance. It is not, however, an index of all-around operating efficiency, because it contains no element through which terminal operation can be checked. Moreover, it is only one element among those which should be used in checking the efficiency of train service. In several periods in the last few years, controversies have arisen as to the relative effect of train-load and train-speed on operating costs. One group has maintained that the lowest cost is to be found when trains are loaded heavily and run at a slow rate of speed. The other group has maintained that the highest efficiency is found when trains are run light at a higher rate of speed. There has been much discussion as to the most economic speed of freight trains. As a matter of fact, both schools are wrong and both schools are right. Both are wrong in laying down one general policy as to the most efficient method of train operation. Both are right in the sense that there are conditions under which one or the other system must be used to produce the greatest efficiency.

Heavy and Light Trains on the Same Road

In measuring the relative merits of the heavier or the lighter train-load, it will frequently be found that there are conditions in different sections of the same railroad where in the one case the heavier train-load at low speed should be used, and others, the lighter train-load at high speed. While a uniform policy applied to the entire system may be desirable, such a policy should not be adopted until it has been found that on each section of the road this method will produce the best results. If the operations on various divisions or parts of the division are closely analyzed and watched and efforts made to bring up both train-load and speed, the point will be found where under practical conditions of operation the lowest ton-mile cost is reached.

An analysis of the train-load on the important eastern railroads will show fluctuations from 1,100 tons to more than 2,000 tons, the figure being very much higher on roads which are considered primarily as coal roads. Surely, the railroad with the train-load of 2,000 tons and over is not twice as efficient as that with a train-load of 1,000 tons. It may well be that the latter is dealing with its fundamental conditions with greater efficiency than the former. The train-speed on these same lines varies from 8 to 14 miles per hour. Efficiency can no more be measured by such differences than by the differences in train-load. Before judgment can be made of the efficiency of freight train performance, whether in train-load or speed, there are certain fundamental elements which must first be known and, where possible, measured.

Factors Affecting Train Loading

The elements which must particularly be given consideration are the physical characteristics, such as ruling grades and curvature, and the length of the average run, and the traffic characteristics such as the balance of traffic in the two directions, the average car-load, the relative amount of perishable merchandise and heavy drag freight, etc. One

of the most important elements is the relative amount of passenger service. On a road similar to the New Haven, freight trains, whether light or heavy, must be run at a sufficient rate of speed to permit them covering their run in the proper length of time and at the same time avoiding delays to passenger trains. Another very important element is the relative amount of local freight service. More than one-third of the freight train-miles on the New Haven are made by local freight trains, while on other railroads which handle a large amount of through or overhead traffic, the local freight service is relatively small. The local freight train which necessarily has a low train-load and a low average speed depresses the average in both train-load and speed for the railroad as a whole.

Still another factor affecting train-load is the diversity of traffic. If traffic is concentrated on main through routes, especially where the haul is long, there is almost nothing to limit the length of the train-load except the capacity of locomotives and the safety of operation. Where traffic is distributive in nature, as in New England, there is not sufficient freight for individual destinations to permit of the heaviest loading. If cars are held a sufficient length of time to permit of such loading the incidental expense and the delay to traffic would offset the advantage of the heavier loading. On the other hand, there is a great deal of misunderstanding among those who believe that railroads in such territory should have their train-load still lighter and the trains run faster. Too much stress is frequently laid upon train-speed as a factor in efficiency just as too much stress is laid upon train-load. Reasonably heavy trains of 2,000 tons or more can be and are operated in New England at a speed to prevent interference with passenger trains. It must be realized that average speed is a measuring stick of time over the road rather than the average speed of the freight train while in motion.

A great deal of confusion arises among those who favor the lighter train-load because the lighter train-load by no means necessarily increases the average time over the railroad. This is particularly true where the line is a busy one and passenger and freight trains frequent. With additional freight trains run, the additional amount of interference is increased and the delays caused to other trains by engine failures, hot boxes, etc., of one train are correspondingly increased. From the point of view of cost, the increased speed is not a factor if the run is handled within the eight hours or within the number of hours derived by dividing the length of the run by 12½. For example, on a run of 100 miles, if the time of the crew is less than eight hours, any movement over and above that in the running time will not effect any economy as far as the cost of freight train service is concerned. Likewise, with runs of over 100 miles where punitive overtime is not paid until the time on the run is greater than the mileage divided by 12½, any speed over and above 12½ miles per hour will not produce economy.

Efficiency Determined From a Combination of Factors

The fundamental fact is that the efficiency of train loading must be determined not from any one factor but from a combination of factors. Efficiency of freight train service on any one railroad, therefore, must be based upon a study of the train-load, speed and train cost of this railroad over a sufficient period of time. Where both train-load and speed increase, it is reasonably certain that efficiency increases. Where one increases and the other decreases, the product of the two should be watched to find the net result of the opposing tendencies. This net result is the gross ton-miles per train-hour.

While the gross ton-miles per train hour is not an absolute measuring stick of the net result, it is better than either train-load or speed separately in that it does tend to show the combined effect of both. The fallacy in using the gross ton-miles per train-hour as an absolute check lies in the fact that it gives undue importance to speed. As previously shown, the effect of speed upon cost is not great when the speed exceeds 12½ miles per hour. On this account it will frequently be found that the gross ton-miles per train-hour will increase with the average speed and the cost will not show a corresponding reduction. Analysis of train-load, speed and gross ton-miles per train-hour should be made before any final conclusion is drawn as to the efficiency of freight train operation.

Statistics of Car Performance

The statistics of car performance on the O. S. report include car-load, the proportion of loaded to total car-miles, miles per car per day, net ton-miles per car-day and the amount and proportion of cars serviceable and stored. On account of the frequent shortage of freight cars, much attention has been devoted to the miles per car per day and tons per loaded car. Great efforts have been made to increase the average car load and it is undoubtedly a fertile field for improvement. If the load per car is increased and the revenue from that car correspondingly increased, the net is increased to a greater extent, since a large element of operating expenses is almost unaffected by a change in car-load. Yet, in considering the efficiency of a railroad from the unit of the average tons per loaded car, one must know the character of its traffic. This applies not only to the obvious factors of the relative amount of coal, ore and other traffic which can be loaded to the extent of 50 to 70 tons per car, but also to the extent that the railroad controls its loading. Some railroads originate a large portion of the traffic moving over their lines and on these lines the fluctuations in the tons per car may be used as a measuring stick. On the other hand, if the greater portion of a railroad's traffic is received from its connections, it is powerless in effecting an improvement in this particular unit. The factor of the relative amount of originating tonnage is of fundamental importance in the consideration of this unit.

In the analysis of the percentage of loaded to total car-miles, the extent to which traffic is balanced is of the greatest significance. In this connection, the O. S. forms contain additional information as to the proportion of loaded cars eastbound and westbound.

Miles Per Car Per Day

Miles per car per day obviously depend, first, upon the factors which go to make mileage, and second, the factors which go to make car days. There are several factors which make car-days and not car-miles. These are:

1. Cars in bad order.
2. Cars stored.
3. Cars at originating terminals being loaded.
4. Cars at final terminals being unloaded.
5. Cars at intermediate terminals being classified.

The second, third and fourth of these elements are almost entirely outside of the control of the operating management. While the first of these elements, bad order cars, is under the control of the operating management to the extent that the number of bad order cars can be reduced, these cars should be excluded in any test of the efficiency of the movement of cars in revenue service. The fifth element, cars at intermediate terminals being classified, is under the control of the management to the extent that the latter can, as a matter of sound operation, reduce the number of intermediate handlings and the delay in each. It is not under the control of the management to the extent that diversity and diffusion of traffic compel a much greater number of intermediate handlings on some roads than on others. Furthermore, if cars are destined to points served by local freight trains, the delay is not under the control of the management unless ruinous expense is undergone in running several local freight trains on the same line each day.

Another factor in connection with intermediate handlings is the length of haul between such intermediate yards. Even if the average delay in intermediate yards on various railroads should be the same, the number of car-days as compared with the car-miles made between such intermediate handlings is very much greater on a road where the diffusion and diversity of traffic are greater than on a road where the traffic is concentrated on a through main route.

Effect of Average Length of Haul

The average length of haul is also of fundamental importance, especially where this is combined with the situation in which the greater portion of the traffic either originates or terminates on the railroad's line. Information as to the amount of traffic originating is available in published reports. Unfortunately, the amount of traffic terminating on each railroad is not known. In connection with car efficiency, the latter is as important as the former and it would be extremely helpful if the reports showed the amount of terminating as well as the amount of originating tonnage. Where the traffic is through or overhead, the length of haul is not of great significance, but where the largest amount of traffic either originates or terminates on a railroad's line, it is extremely important since the delays at the originating or final terminal are the same regardless of the length of the haul. All of the factors, therefore, which make car-days without making car-miles, must be analyzed before conclusions are drawn as to operating efficiency.

The relative effect of these facts is shown by a comparison of the miles per car per day on various railroads. Here there is a variation from three or four miles per day to 40 or 50 miles per day. Invariably, it will be found that the railroad with three or four miles per car per day is a terminal road with short haul and with all the traffic either originating or terminating on its line. A notable example of this is the Long Island. At the other extreme it will be found that the railroads having 40 or 50 miles are, for the most part bridge carriers, where a substantial portion of the traffic is overhead to that line. A notable example of this is the Lehigh & Hudson. Similar examples can be found between these extremes. The New Haven originates and terminates substantially all its traffic, but having a longer haul than the Long Island and having a less portion of local freight service, it is able to make greater miles per car per day than the latter road. On the other hand, when the New Haven is compared with most of the railroads in trunk line territory, or even with other railroads in New England, it is unable to make the same miles per car per day because it combines a greater portion of originating and terminating traffic with a shorter haul and with greater diversity of traffic with the accompanying larger number of intermediate terminal handlings. The efficiency of a road, therefore, in its car use, can be measured only when all of the factors are given due consideration. It will frequently be found that when these factors are given consideration, the railroad with the lower miles per car per day in total has a higher miles per car per day for cars which are handled in a comparable manner.

Net Ton-Miles Per Car Per Day

On the O. S. reports the unit which is usually taken as a summation of car efficiency is the net ton-miles per car per day. It takes into account car load, percentage of loaded to total car-miles and miles per car per day. In consideration of this item, however, it must be remembered that all of the qualifications of the analysis of car-load and car movement must be taken into account in the analysis of this unit. If a railroad, on account of its operating or traffic conditions, is unable to obtain a high car load or a high percentage of loaded to total car-miles or a higher mileage per car per day, each and everyone of these factors will prevent the securing of a high figure in net ton-miles per car per day.

The use of these statistics showing the utilization of a locomotive as measured by the miles per day and the gross ton-miles or net ton-miles per locomotive per day, also must be qualified unless consideration is given to certain factors which govern the performance. The miles per locomotive per day are dependent upon the amount of business available, the extent to which business is balanced, the average length of engine runs and the amount of local freight service. In certain cases, the railroad has been able to locate its terminals in the past with due consideration to the length of the runs operating out of those terminals. In other cases, the location of the terminal is prescribed by the general operating conditions and the length of the run is likewise predetermined. Where this distance is short, namely, from 50 to 75 miles, consideration must be given to the question of using turn-around service. Frequently one-way service is found in the end to be cheaper than the turn-around service, although this factor does reduce the average miles per locomotive day. In consideration of the use of locomotives, care must be taken to analyze other factors as well. It may be that the greatest economy can be secured through a combination which will decrease the miles per locomotive per day.

An increased train-load will decrease the number of locomotive miles to handle a given class of traffic. This may effect a substantial economy in freight train operation, but this fact will not be reflected in the miles per locomotive per day. It will, however, be reflected in the gross ton-miles per locomotive per day. These facts all provide another example of the danger of using any one unit as a measuring stick of operating performance.

Fuel Economy

The unit of pounds of coal per 1,000 gross ton-miles has been included to show the efficiency in the utilization of the largest single account of our operating expenses. The consumption of fuel is dependent not only upon factors such as the efficiency of the engine crew, condition of the locomotive, efficiency of the locomotive design—factors over which the management has direct and constant control—but it is also affected by the same factors which affect train-load, such as grades and curvature, the balance of traffic, etc.

Furthermore, when there are factors which make it impossible for the locomotive to be used to its full efficiency, these tend to increase the pounds of coal per 1,000 gross ton-miles. There are many items of this character which are largely beyond the control and management. Among these are the amount of helping and light mileage and the amount of local freight service. Frequently, a helping engine is not used to its full capacity in either direction. It is producing no ton-miles when it is running light in return from a helping movement. Such a method of operation is justified from the point of view of efficiency, yet the results cause an increase in the pounds of fuel per 1,000 gross ton-miles as compared with a railroad where the amount of helping service is negligible. Likewise, where there is a large amount of local freight service, the locomotive is used to a very small portion of its capacity, but on account of frequent stops, the large amount of switching with no resulting ton-miles, the pounds of fuel per 1,000 gross ton-miles are very high. Where the amount of local switching is relatively great, the pounds of fuel consumed per 1,000 gross ton-miles reflect this condition. These elements on different railroads must be given their weight in comparing the results.

OS-B—Passenger Service Performance

The efficiency of passenger service is in some respects more difficult to measure than that of freight service. This is due to the fact that to a large extent the amount of pas-

senger service provided is fixed. This is particularly true in the case of light lines where only a few trains are operated per day, but where the public convenience, backed by public utilities commissions, requires a certain amount of passenger service, which, from the point of view of economy, is not justified. When passenger trains are operated on the basis of schedule, the number run from day to day and from week to week remains approximately the same, the only changes being when new time-tables are issued. This means that passenger train expenses, except when there are changes in the time-tables, are, to a large extent, fixed. The same is true of passenger station expenses. The station forces are the same throughout the year except for a few changes in summer and winter where the vacation traffic is a factor. For these reasons, the items of passenger performance and their fluctuations from month to month do not measure the efficiency with which the passenger service is handled. After all, the fundamental question in passenger train service is the operation of the trains on their schedule and the percentage of trains on time is the best and most accurate measure of such performance. Where matters of train and car-load are fundamental in freight service with reference to cost, the train-load and car-load in passenger service, except over longer periods, is not significant in measuring the efficiency of this service.

These facts are reflected to a large extent in the monthly statement of passenger service performance known as OS-B where the unit statistics are found. The passenger cars and passenger train cars per train fluctuate little from month to month, and in many cases, from year to year. The efficiency of the utilization of locomotives is shown in the miles per locomotive-day, the per cent of locomotives unserviceable and the pounds of coal used per locomotive-mile and per passenger train car-mile.

In the consideration of the miles per locomotive per day, the same underlying factors mentioned in connection with freight service apply to passenger service. Where the largest amount of traffic is made up of long haul through trains, the miles per locomotive per day are high. Where, however, there is a large amount of commutation business and branch line business, the miles per locomotive per day are definitely limited. In the commutation service, sufficient locomotives must be provided to take care of the peak of the movement. Many of these locomotives can not be used except for one round trip. Where, as frequently is the case, this round trip is made from a point less than 30 miles from a large city, the effect of this limitation on the miles per locomotive per day is obvious. The same applies to branch line passenger operation. Here, the minimum amount of service provided limits the mileage which a locomotive can make unless it can perform a round trip of freight service between its trips in passenger service.

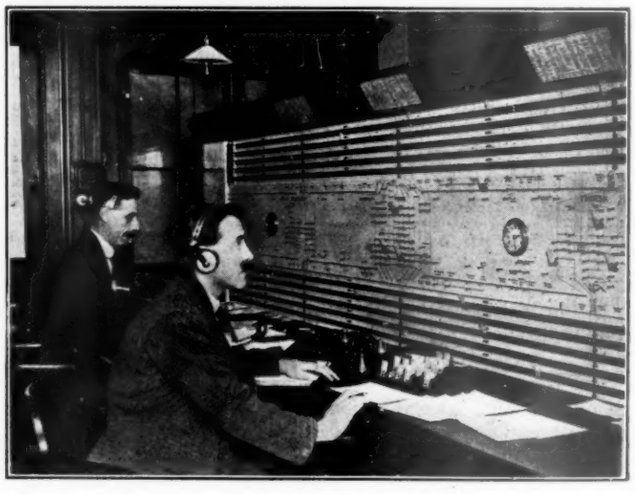
Frequently, efficient operation will call for the elimination of certain trains on a branch line. Such elimination will effect the economy in fuel, train supplies and train wages. This elimination will reduce the average miles per locomotive day on that branch unless the engine can be used for some other service. Here again the decrease in the miles per locomotive brought about may disclose a condition which is actually an economy; yet, if this unit is used by itself, such an economy will not appear.

The measuring stick of efficiency of fuel performance, namely, the pounds of coal per car mile, is also affected by the amount of local service. In this case, this is due to the frequent stopping and starting of trains. On this account, railroads having a large amount of commutation branch line and other local business will be found to have a higher fuel consumption per car-mile. Other factors similar to those in freight service also have their effect, including physical characteristics, efficiency of the locomotive and its condition, but the factors previously mentioned which are beyond the control of the operating management are fundamental in their effect upon these units.

OS-C—Locomotive and Train Costs

The third O. S. statement shows the effect of the various performance factors on the cost of the same elements of expenses. The use of this statement during the last three years has been largely nullified by the changes in rates of pay and prices of fuel and materials. These have caused fluctuations in these units but for which the units would be extremely valuable. As stated previously, in considering the relative importance of train-load and speed, the final consideration should be the expense. It has, however, been impossible to check this unless the figures were first equated so that the fluctuations reflecting changes in extraneous elements were first eliminated. With the gradual standardization of rates of pay and prices, this form will gain in importance. In comparing the situation on different railroads, however, there will always be factors which must be taken into account where operating and traffic conditions make impossible as heavy a train-load or as high a speed on one road as on another. These facts will be reflected in the cost. The effect of train-load upon cost can be measured, however, since the cost of the various train expenses are shown both on a train-mile and a gross ton-mile basis.

In this article there has been an attempt only to indicate the important fundamentals underlying the various units in the O. S. reports. Each railroad has its own set of operating conditions which are peculiar in themselves and which affect the performance as measured by the O. S. reports. These conditions peculiar to an individual railroad, frequently make it next to impossible to measure the efficiency as compared with that of another road, because the underlying facts which must be given consideration are not measured. It probably will not be possible at any time, without very elaborate reports, to furnish the background which will enable the measuring of the relative operating handicaps of different railroads. This does not nullify the importance of the O. S. reports in the hands of those who have general knowledge of conditions on various lines. It does, however, render serious embarrassment to individual railroads and to the railroads as a whole where the reports are used with little or no knowledge of general conditions and where it is assumed that the statistics themselves form an accurate measure of operating efficiency.



Keystone

"Train Control" Office at York, England, on the London & North Eastern

Canadian National Motor Coach Driven by a Reo Six-Cylinder Automobile Engine

Recent Developments of the Motor Coach*

Reasons for Renewed Interest—Advantages and Disadvantages of the Various Types—Performance Data

By C. E. Brooks

Chief of Motive Power, Canadian National Railways

THE MOTOR COACH is not a new departure but is one which has sunk back from a promising start 15 years ago into obscurity due essentially to high maintenance and operating costs. During the past three years, however, interest in the subject has been actively revived as a result of

a The ever-increasing encroachment of the motor bus on railway earnings

b The improvement in the design of the motor and its appurtenances, and

c The attitude of the public, which the automobile is rapidly convincing that plush seats are not necessary when traveling short distances.

In order to enter into a discussion of present-day developments it will be necessary to outline briefly the service requirements, and in doing so the motor coach is presented as a "unit car" and not as a train of cars or a driving car hauling a trailer. The latter methods of operation may be possible on small interurban or suburban lines, but for practical transportation purposes they are not being considered by many large railways. The reason for this is that up to the present time it has not generally been found to be economical to replace a necessary train service with a motor coach hauling one or more trailers on account of motor-capacity limitations.

On the other hand, high train-mile costs for small returns have forced railway officials to turn to the motor coach for relief in the following classes of service:

a Giving a frequent passenger service on sparsely settled branch lines or parts of main line adjacent to market towns or junction points

b Connecting junction points on important main lines with the town or small city situated within a few miles of the main line

c Giving a group of towns situated on a main line or important branch lines a frequent connecting service over and above through main-line trains

d Connecting small summer resorts, golf clubs, etc., to branch-line or through main-line service

e Handling milk of a limited amount to a distributing or connecting point

f Providing connections to small suburbs.

Among the first real developments of the motor coach was the gas-electric car, the use of which spread rapidly 15 years ago but which unfortunately did not solve these problems successfully on account of high maintenance cost of the heavy-duty gasoline motor, uncertain service, complications of equipment, and great weight of the coach itself.

About the same time steam units having considerable weight and all the complications of the locomotive appeared, but were discarded for much the same reasons.

Classification of Present-Day Developments

Present-day developments are generally to provide for traffic requirements which for the purpose of discussion are subdivided as follows:

Class A—A seating capacity of from 24 to 40 persons and provision for approximately 100 sq. ft. of baggage space. The light weight of such a car to be from 18,000 to 30,000 lb. or not to exceed 750 lb. per single seat (with baggage space) or 500 lb. per seat if no baggage space is allowed.

Smaller cars have been made and are in daily use, but considering the rapid development of traffic after cars are put into service, it is believed that the above-mentioned limits are reasonable.

Class B—Units seating from 40 to 60 passengers and providing for baggage space a minimum of 100 sq. ft. and maximum of 200 sq. ft. These cars weigh from 800 to 1200 lb. per single seat, but it is thought that the weight must be kept down to the same limits as those prescribed for Class A in order to get fuel economy and keep maintenance costs at a reasonable figure.

Speed Requirements. Schedule speeds of 15 to 25 m.p.h., including stops.

* Abstract of a paper presented at the Montreal meeting of the American Society of Mechanical Engineers, May, 1923.

Generally speaking, Class A units have been gasoline-driven, and the experience of many railways goes to show that this class of equipment is an economical and lasting development which will be improved to the point of high-grade automobile reliability within a short time. Already in many places these cars have retrieved business which had been lost to bus lines on the highways and also to the privately-owned car, and it has been the usual thing to find that passenger traffic develops to a marked extent after a service has been instituted.

The failures have been rather heavy due to conditions described later in this paper, to the overexacting requirements of time tables, and to non-realization of the limitations of the gasoline motor.

For the purpose of description Class B units may generally be subdivided into (*a*) storage-battery, (*b*) steam, (*c*) heavy-duty gasoline-engine, and (*d*) gas-electric cars.

Class A Cars

Gasoline-Engine-Driven Motor Coach. For Class A cars weighing approximately 30,000 lb. light weight, the general practice has been to use a highgrade four-cylinder truck engine running at a maximum speed of approximately 1600 r.p.m. and developing a maximum of 70 hp. Wherever this type of engine has been used it has transmitted its power through clutches, transmissions, and universals to gears, most of which are of standard truck or even heavier design.

To a much less extent the automobile-type six-cylinder engine has been experimented with. In general its power has been transferred through standard automobile clutches, transmissions, etc., which are used with the same type of engine in automobile service.

So far as the actual power plant is concerned, it is the opinion of many that the automobile engine has in almost every way demonstrated its superiority over the truck engine for Class A cars and for general service because of its ability to run over rated speed without serious loss of balance and consequent excessive vibration, and its economy under light load conditions. The first of these reasons undoubtedly embraces conditions which are vital to the successful maintenance of any machine or engine.

Practically any high-grade automobile engine designed for a rated engine speed of approximately 1450 r.p.m. at 30 m.p.h. with a gear ratio between 4 to 1 and 5 to 1 may be driven at engine speeds of 2200 r.p.m. and car speeds of from 50 to 60 m.p.h. without any noticeable vibration of a serious nature. Experience indicates that a similar flexibility cannot be expected from truck engines for any length of time without serious engine trouble developing and possibly resulting in a complete breakdown of the service.

When a motor coach is being operated on a railway where there are schedule connections to make and where there are meeting points designated by train orders and by time card, it is certain that, regardless of the framing of a schedule, which should not develop an engine speed over that coinciding with the rated speed of 35 m.p.h., the operator will frequently exceed this by 15 or 20 m.p.h. in order to meet the requirements of the service after a delay of any kind. There is nothing parallel to this in highway work with either the automobile or the truck, but it is such an accepted fact on a railway that the only safe course is to provide the type of power plant which will meet these requirements daily without breaking down; in other words, the power plant must be moved out of the sphere of ordinary usage and into what might be called the outer edge of racing conditions. Railway gradients even accentuate this condition, as there is practically no opportunity for letting the engine cool off as there is on the highway.

The automobile engine has been designed not only for easy and economical low-engine-speed conditions, but also for those outlined in the preceding paragraph, and the experience of several railways in this country with a number of cars operating under extremely different conditions seems to bear this out, which leads to the conclusion that the light-weight, high-speed gasoline engine is a satisfactory power plant for the light-weight cars described as Class A.

Class B Cars

Storage-Battery Car. Within a radius of operation of from 100 to 140 miles this car has been extremely satisfactory and is being operated successfully under low-temperature conditions with no appreciable trouble. Its tractive effort of 2400 lb. makes it possible to use a trailer if necessary. The cost of operation, including all maintenance and transportation charges, power, etc., is 17 cents per car-mile. The maintenance has been extremely light, and all indications are that the life of the batteries will be eight to ten years at least.

Steam Cars. The steam power plant was probably the first of any kind to be tried for self-propelled cars, but unfortunately its development has not kept pace with requirements. Medium-pressure (300 to 400 lb.) boiler plants with comparatively low superheat (100 deg. F.) were introduced to a considerable extent in continental practice several years ago, but the use of the steam car has not developed, due principally to excessive weight and general complications of equipment, and inefficiency of the boiler plant.

Recent developments indicate that while the seriousness of these defects has been noted and improvements have been made, they have not yet been overcome to the point where steam power may be considered to be the most satisfactory unit car power.

Heavy-Duty Gas Car. This class of car has not been tested to the point where any accurate data may be given, but it is evident that the gasoline consumption will be at least twice that of a Class A car per car-mile. The problem of handling through transmission and clutch the mechanical drive from a gasoline engine of possibly 200 hp. has not yet been solved unless it may be through the medium of the oil transmission so successfully used in navy work. However, the extreme complication of this transmission or magnetic control makes it doubtful at the present time whether gasoline power plants will successfully exceed 70 hp. in capacity.

Gas-Electric Car. Mention has already been made of the car of this type which came into prominence about 15 years ago and which was practically discarded on account of its unreliable power plant and general complication.

The first-mentioned cause of failure has undoubtedly been overcome and reliable constant-speed units are now in general use for generating purposes. If it were possible to eliminate the starting troubles when using types of engines suited for low-grade and cheap fuels, there would be no doubt about the general use of this type of equipment on account of unit power costs.

The gas-electric system provides double-ended control and an efficient starting torque but still retains all the complications of a dual power plant.

It is thought that there may be a possibility of employing a smaller-capacity constant-speed gasoline engine (average running power consumption approximating 25 hp. for cars weighing 60,000 lb. loaded) which will drive a generator charging a limited battery capacity. Theoretically this might provide the starting torque desired and at the same time eliminate the undesirable features of the large power plant, but it could not be an economic consideration where cheap power could be purchased.

Ball and Roller Bearings have been one of the most important factors in the development of the motor coach. Exhaustive tests indicate that the ball bearing has reduced starting friction under summer conditions to approximately 15 per cent of that of plain bearings, or in other words has reduced friction of approximately 20 lb. per ton to 3 lb. per

ton. At the same time the average rolling friction at speeds up to 30 m.p.h. has been reduced by approximately 40 per cent, or from 3.6 lb. per ton to 2.2 lb. per ton.

Experience in this country indicates that the ball bearing is suitable for Class A cars, but that the areas and sizes for designed industrial work should be at least doubled for railway work due to excessive shocks and side thrusts.

For Class B equipment it may be necessary to use roller bearings for vertical loads in connection with special bearings for side thrusts.

Transmission and Type of Drive

While it has been stated that the automobile engine is most suitable for the light motor coach, it must nevertheless be admitted that experience indicates that standard automobile transmissions, clutches, universal connections and driving gears are entirely inadequate for motor-coach service and are the cause of probably 75 per cent of the breakdowns. Similar parts which have been developed for truck engines are generally much superior due to their greater size and strength per horsepower transmitted.

The method employed in transmitting the power to the wheels has generally been one of the following:

1. Through a standard transmission to one driving axle which supports the entire two-wheel rear truck. While this is the simplest method it is not the opinion that it will ever be generally acceptable to the railways.

2. To both axles of the front four-wheel truck by gearing and universal connections from a transmission located behind the truck. Experience on some railways goes to show that this method is successful, and the driving forces are removed from the passenger-carrying part of the cars, thereby reducing vibration.

3. To a transmission located at about the center of the car and from there to nearest axle of each four-wheel truck or to both axles of two-wheel trucks. The advantage claimed is that the entire weight of the car is available for adhesion (where the trucks are of the two-wheel type), but general experience indicates that this is not necessary and is harder on the engine than where part of the momentum of rotating parts may be taken up by slippage. Where four-wheel trucks are used this method has been found to give better adhesive qualities than connecting to both axles of one truck, but the advantage seemingly is not sufficient to warrant the extra complication.

4. To leading axle of rear four-wheel truck. The chief advantage of the drive to the rear truck is that the engine may be aligned in such a manner as to have its shaft center line pass through the center line of the main driving axle, thus reducing wear on the universals and friction. The disadvantage is that it necessitates the use of one or more supplementary bearings between the engine and the point where the drive shaft is coupled to the front universal.

Methods of transmitting power from the front axle to the rear axle of rear truck may be subdivided as follows:

a Chain drive. Chain drive has the disadvantage of rapid wear, noise, and the complication of shields and covers which more than overcome the advantage of the straight drive to the rear truck.

b Gear drive. Gear drive to the second axle no doubt appears to be the best mechanical means of transmitting power, but it has all the disadvantages of rapid wear due to difficulty of adjustment of contact and the maintenance of extra universals.

c Side rod and cranked wheels. Side-rod drive to the second axle, along with many other locomotive developments said to be crude and inefficient, in actual practice is a thoroughly reliable and easily adjusted and inspected arrangement, and is operating successfully at high and low speeds and with no appreciable friction.

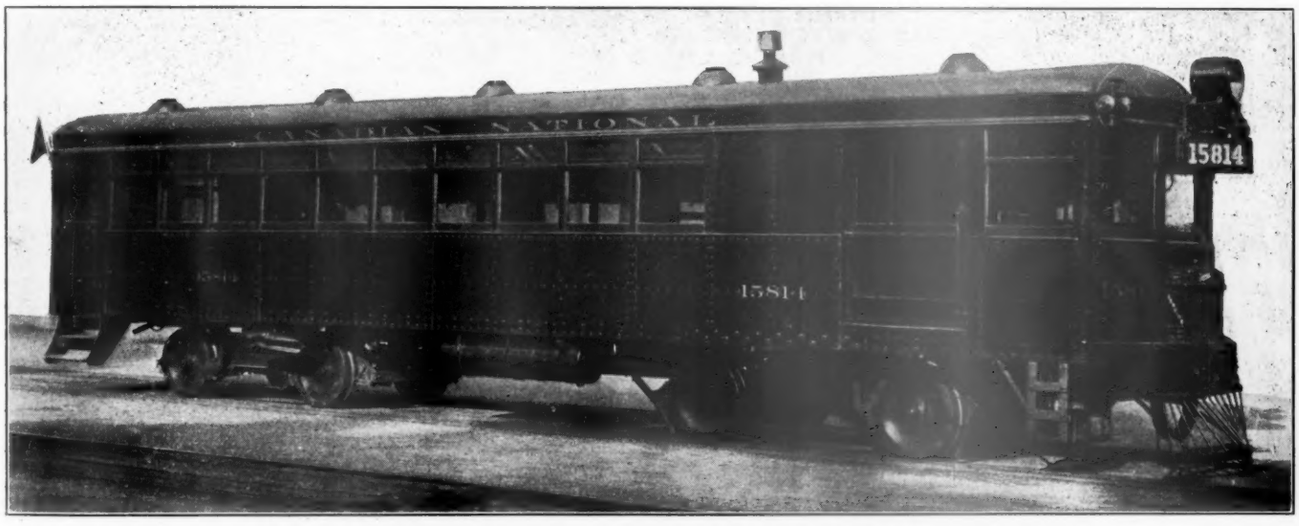
d Miscellaneous, including oil transmissions that are still being experimented with.

Summary

There is no doubt a great difference of opinion regarding what type of motor coach will fulfill the requirements best. It is apparent that there will be important developments in railway motor cars, both as regards design and field of service, and therefore the following conclusions may be considered as preliminary only.

Class A Cars (30,000 lb. max. light weight), driven by automobile-type, 6-cylinder gasoline engines, should have the following general characteristics and limiting conditions: 1.6 hp. per 1,000 lb. light weight of car at engine speed of 2,100 r.p.m., giving a car speed of 35 to 40 m.p.h. Weight of car per passenger seat, maximum 750 lb.; weight of car per maximum hp., 600 lb. Gear ratio between engine and wheel for ruling grades not exceeding 1.25 per cent, 4.7 to 1.

Class B Cars. It is difficult to come to a general conclusion with regard to this class of equipment, as it appears that only one class of car has actually passed the experimental stage. One of the Canadian railways has found the battery car to be a thoroughly reliable and economical unit to operate, provided that the schedule will permit of charging time.



Canadian National Gasoline-Driven Motor Coach Built by Service Motor Truck Company

Severe weather conditions have had but little effect on the operation, and the simplicity of the power-controlling devices eliminates any opposition from the operators.

The chief obstacles in the development of this type are the first cost and, in some regions, high power costs, but it is felt that the great advantage it possesses of double-ended operation without complication more than offsets any serious disadvantages.

In conclusion, it seems safe to say that there is a fairly large field for the motor coach in railway work and that it will not be developed from without but rather from within—slowly, conservatively, by motor manufacturers and railway engineers, as the traveling public will never tolerate from railway companies the difficulties and disappointments which have been visited on them by the automobile manufacturers. The railway engineer to do his part in this problem must be familiar not only with operating conditions but also with the labor problems which are sure to arise in such a development, making it necessary and advisable to give consideration to the employee operating this equipment and to the public using it.

Discussion

L. Klopman (Railway Storage Battery Company): I agree with all that the author has said in favor of the storage-battery car, but that the paper did not go quite far enough in presenting its proved utility and service.

The author had divided self-propelled cars into two classes placing the storage-battery car in the heavier class (B) but excluding it from the lighter (A), or that for cars having a seating capacity of 24 to 40 passengers, a baggage space of approximately 100 sq. ft., and a car weight of from 18,000 to 30,000 lb. Storage-battery cars answering this description had been in successful operation since 1917 on the Chattahoochee Valley, on the Long Island since 1914, and elsewhere, which had a seating capacity of 32 to 40 passengers, a baggage space of 80 sq. ft., and a weight, including battery, of 28,000 lb.

There was no reason why a storage-battery car such as this could not meet every test which had been successfully met by the gasoline-engine-driven motor coaches under Class A, and not only meet these conditions, but more economically and with greater reliability in operation than the gasoline car.

The multiplicity of troubles and complete failures which were inevitable with any kind of combustion engine and drive after considerable service necessitating shopping of equipment and consequent substitution, were matters worthy of serious thought.

This was to be compared with the simple, effective electric motor and control of the storage-battery car, which was as nearly absolutely foolproof as any mechanism yet devised. The four-motor drive permitted in the remote contingency of failure of even two motors, of the remaining two motors propelling the car. A mechanical or electrical failure of the battery in this service was so remote as to require no consideration. Its initial cost was admittedly higher, but in a comparatively short period the low cost of maintenance both for the battery and the electric motors soon equalized the difference.

The life of the storage battery of which he was speaking had proved to be over 10 years in this class of service and, in fact, cars were now in operation in Canada the batteries of which had been installed as far back as 1914.

It was to be remembered that all storage-battery cars were equipped for double-end control, which meant both economy of time and money in operation. The author had cited the use of these cars to connect junction points, small summer resorts, golf clubs, etc. This service would hardly warrant the cost of installation of a Y or turntable such as the one-end operation of a gasoline motor car made necessary, and it was only fair that the cost of such installation be deducted from the initial cost of storage-battery operation.

So far as Class B cars were concerned, in stating the maximum radius of operation, the author had limited himself to the statement that its maximum radius of operation was 140 miles on a full charge. This statement was correct as far as it went, but cars of this size had made and were making up to 235 miles a day where facilities were available and operating schedules permitted time for intermediate charging.

First Cost an Important Item

R. G. Gage (Canadian National): One of the chief items that should be watched in connection with storage batteries was the first cost—not perhaps in the car itself, but in the different facilities for making low cost of operation. The charging facilities sometimes were difficult to procure. The question of operation of the storage-battery car in Canada was important. At certain times of the year, with the temperatures which they had, it was absolutely necessary to start the car out properly charged, but in such cases it had been his experience that there was little trouble. That was one of the serious things that must be given consideration as regarded the proper scheduling, which those having to do with transportation were not always ready to realize.

J. A. Shaw (Canadian Pacific) stated that the railway company with which he was connected had installed four gasoline-engine-propelled cars to transport passengers from the station to its hotel. They operated for four months each summer and carried all the supplies and fuel as well as passengers. The cost of gasoline for operation per annum was about $1,000.

Closing Remarks

Mr. Brooks, in closing, said that the chief reason why he believed that the gasoline-driven car was the most suitable to fulfill the requirements outlined for Class A cars was the requirements of the service.

These small units were often used in sparsely settled parts of the country where the only hope railway companies had of making anything out of the service was in its frequency. His company had driven cars fitted with automobile engines on regular schedules which necessitated covering 360 miles per day, up to 50,000 miles before any appreciable repairs had been necessary to the engine.

It was necessary, he said, to differentiate between experience derived from highway-run service and mechanical equipment driven on steel rails. He felt sure, from what he had seen, that the life of a gasoline car motor running on steel rails would be five or more times that of a gasoline automobile motor on highway service.

It was necessary to remember that in Canada, where car batteries had to be imported, their cost would run close to $20,000. If necessary, the complete gasoline power plant in one of the Class A cars could be junked every year for practically the interest on that amount alone, without repayment of the cost of the batteries. It might appear at first that it was wise to figure on writing off the value of an automobile engine driving one of these small units after, say 50,000 miles. Experience had indicated, however, that it would be proper to allow 150,000 to 200,000 miles on that kind of service. But even if conditions were such as to make it advisable to junk the engine at the end of 50,000 miles, he still thought it would be better to do this rather than to incur the heavy expense for the storage battery, which necessitated a large investment in the charging equipment where cheap power could not readily be tapped. He appreciated the value of the storage-battery car, but felt that for certain classes of service it was necessary to have something cheaper and more flexible.

The Needs of the Denver & Rio Grande Western

Study Shows Necessity of Large Expenditures to Increase Capacity and Reduce Operating Costs

THE MAGNITUDE of the problem confronting the officers of the Denver & Rio Grande Western in the rehabilitation of that property is evident from a report which has recently been made for Judge J. Foster Symes of the United States District Court of Colorado by B. B. Greer, operating vice-president of the Chicago, Milwaukee & St. Paul. The Rio Grande is unique among the larger railways of North America because of the physical difficulties which it must overcome in the handling of its traffic. It is a mountain railway for practically its entire mileage, with all of the problems incident to such a condition. Its progress has been further complicated by unfortunate financial management in the past which has made it impossible to make adequate expenditures for the maintenance and improvement of the property.

Mr. Greer was asked by the court to review a report made by Joseph H. Young, receiver of the property, on September 6, 1922, recommending a budget for additions and betterments aggregating $23,792,518 to be spent within three years from August 1, 1922, to put the road in proper condition. The more important items of this budget were as follows:

Widening cuts and fills, filling trestles, etc.	$605,000
Ballasting	1,099,250
Rails and other track material	6,132,024
Bridges, trestles and culverts	1,389,250
Additional yard tracks, sidings and industry tracks	1,043,124
Changes of grade and alinement	507,100
Section houses and other roadway buildings	273,250
Freight and passenger stations, office buildings and other station facilities	221,856
Water stations and appurtenances	320,000
Shop buildings, enginehouses and appurtenances	2,220,200
Shop machinery and tools	534,700
New equipment	6,226,283
Improvements to existing equipment	2,251,859
Total	$23,792,518

In his report, from which the following information is abstracted, Mr. Greer pointed out the fact that the ton-miles of freight traffic have decreased 20.8 per cent since 1917 and the gross revenues 17 per cent, while operating expenses have increased 33.33 per cent. This decline in tonnage has been due in part to a marked decrease in the through traffic for which the Rio Grande acts as a bridge line, this traffic having declined from 1,031,045 tons in 1917 to 374,181 tons in 1922. A similar decrease is noted in the traffic local to the line, this having declined from 7,675,758 tons in 1917 to 3,736,549 tons in 1922. Offsetting this to a slight extent was an increase in the traffic originating or terminating on the road and interchanged with other lines, which traffic increased from 4,990,236 tons in 1917 to 5,533,367 tons in 1922. The loss in traffic was particularly marked in products of the mines and manufacturer's products which comprise nearly 85 per cent of the traffic of the road.

One of the problems confronting the Denver & Rio Grande Western is the large proportion of branch lines, 1,057 miles out of a total of 2,604 miles being of this class. Although the traffic originating on these lines contributed over $10,840,000 to the gross earnings of the system in 1921, only 3 of the 27 branch lines earned sufficient amounts directly to pay their operating expenses and taxes. These lines are, however, valuable feeders to the main lines and contribute largely to their earnings.

The fact that the property has not been adequately maintained is emphasized by a comparison between the expenditures of this road and those of other western roads. The curtailment of expenditures is particularly evident when compared with those of the Rock Island, which has been in a somewhat similar financial condition but which is a prairie rather than a mountain road and which, nevertheless, spent more money per mile on its track than the Rio Grande with the exception of 1917 and 1921, when the latter road incurred extraordinary expenditures due to floods.

The shops and enginehouses are considerably below a good standard average in capacity and equipment and undoubtedly contribute largely to the unfavorable locomotive performance of the road. The improvements in housing, shop machinery and tools, which are contemplated and authorized at a number of points, are well planned and should place the handling of motive power on a more satisfactory basis. Mr. Greer recommended further expenditures for shop tools and machinery at engine terminals so that they will be more self-sustaining in repairs than they are now, as few are equipped to do repair work requiring machine tools and such work is generally sent to the main shops, delaying the return of the locomotive to service. The roundhouses generally at the outside points and in the cold weather country are not equipped with steam heat but are heated by stoves and Mr. Greer pointed out that proper steam heating equipment will pay for itself in a short time at most of these points.

Although 23 per cent of the locomotives were in the shops or awaiting the shops on May 31, there has been a marked improvement since the first of the year. The poor condition of the locomotives is due primarily to the shopmen's strike, although this condition was accentuated by the fact that the main shops were closed during part of December, 1921, and January, February and March, 1922, during which time only 24 engines received classified repairs.

The roadway and track conditions are most serious. There has been no general improvement in track conditions on the standard gage main line for the last 10 years except between Helper and Provo, and little or none on the narrow gage lines and other branch lines since they were built. The embankments which carry the track on the standard gage main line were built largely for narrow gage track and in many instances were not widened to any extent when the line was converted to standard gage. Many of the embankments on the standard gage lines are less than 12 ft. in width. On the narrow gage lines conditions are even more serious, many of the higher fills on the Cumbres Pass line being not over six feet wide, these embankments frequently occurring on sharp curves ranging from 14 to 20 deg. Derailments are particularly serious on lines such as these because of the absence of a shoulder to support the equipment and prevent it from rolling down the bank.

In his estimate submitted to the court, the receiver included an item of $605,000 for widening cuts and fills. This, however, included the protection of embankments against washouts and river encroachments so that the amount actually recommended for bank widening was only $300,000, and this was confined to standard gage lines. Mr. Greer recommended that the budget for bank widening alone should be increased to $1,000,000 and for protecting against river encroachment, rip rapping, channel changes, etc., $500,000 additional. He urged that the receiver make an immediate study of this condition in order to prepare a definite recommendation for the immediate authorization of the work.

The tie and rail situation was reported as generally satisfactory. The policy of the management in using the 85-lb. rail released from the main line to release 65-lb. and lighter sections from branch lines which can in turn be used on

narrow gage lines in place of 30-lb. to 50-lb. rail was commended.

The ballast condition is not as satisfactory. Mr. Greer recommended the addition to the budget of $1,056,000 for ballasting 264 miles of the main line between Denver and Salt Lake. He also recommended that over 900 miles of branch lines and narrow gage lines be ballasted, including the Cumbres Pass line, the Marshall Pass line and a branch to Santa Fe, N. M. He recommended that $1,000,000 be appropriated for this work.

Summarizing this report, Mr. Greer concurred in the recommendations of the receiver in large part and recommended that additional expenditures aggregating $6,059,000 be authorized.

Transportation Factors in the Soft Coal Business

WASHINGTON, D. C.

THE TRANSPORTATION TROUBLES of the soft coal industry were laid before the United States Coal Commission on September 5 by counsel for the Bituminous Operators' Special Committee, in a brief analyzing the situation with the expressed hope "that a clear understanding of the difficulties of coal transportation may point the way to the mitigation of some of the hardships arising from the recurrence of periods of coal shortage and the consequent high prices." The brief made plain at the outset that the problem of securing an equilibrium of the supply and demand for coal cannot be solved merely by improving the nation's transportation machinery, while cyclical and seasonal fluctuations in demand, interruptions of production through labor disturbances, and other factors remote from transportation cannot be controlled.

The attention of the coal commission was particularly directed to these factors as affecting moving coal from the mines to the consumers:

"1. The railroads cannot increase their coal transporting facilities nor maintain existing facilities efficiently unless they are permitted to earn a return on their investment which will make the owners of capital willing to supply their needs. The continual threat of confiscation by demands for oppressive regulation tends to make this impossible.

"2. There should be no assignment of cars for railroad fuel and, during periods of car shortage, no open-top cars should be furnished to 'wagon mines.'

"3. To protect the supply of open-top cars available for loading coal: (a) Every railroad participating in coal traffic should furnish its share of open-top cars, and should recognize the fundamental importance of keeping the fuel moving over its lines, not being permitted to subordinate the movements of coal to the movements of more profitable commodities, thus accentuating a shortage which tends toward an abnormal market price for coal. (b) Railroads receiving loaded coal cars from connections during periods of coal car shortage should return an empty coal car for each loaded car it receives. Regulations to enforce early returns of empty coal cars, with automatic penalties, should be made and enforced.

"4. Coal and transportation shortages of greatest duration and violence have proceeded from strikes of national combinations of mine and rail workers. Increased transportation facilities would mitigate, but not prevent, such shortages. The only effective remedy is the prevention of nation-wide strikes in these industries."

The brief said that when the mine workers are not on strike in substantial numbers, the transportation factor sets the limit upon the quantity of coal which can be delivered to consumers. Another point was that transportation by railroad is not amenable to the law of supply and demand, that when demand is good for coal and the price higher than usual, transportation must be furnished to all who demand it. This pro-rating of the car supply when prices are up, enabling mines which are expensive to operate to put out coal, the brief said, curtails the supply of cars to low-cost mines, and thus holds down the production of coal which can be mined and sold at a lower price.

As to the number and capacity of cars suitable for hauling coal, the brief sets forth the view of the bituminous operators that this subject is adequately covered by existing legislation, but calls attention to the fact that fair treatment to the railroads, to protect their credit, is essential to enable them to expand their rolling stock as demand for it increases.

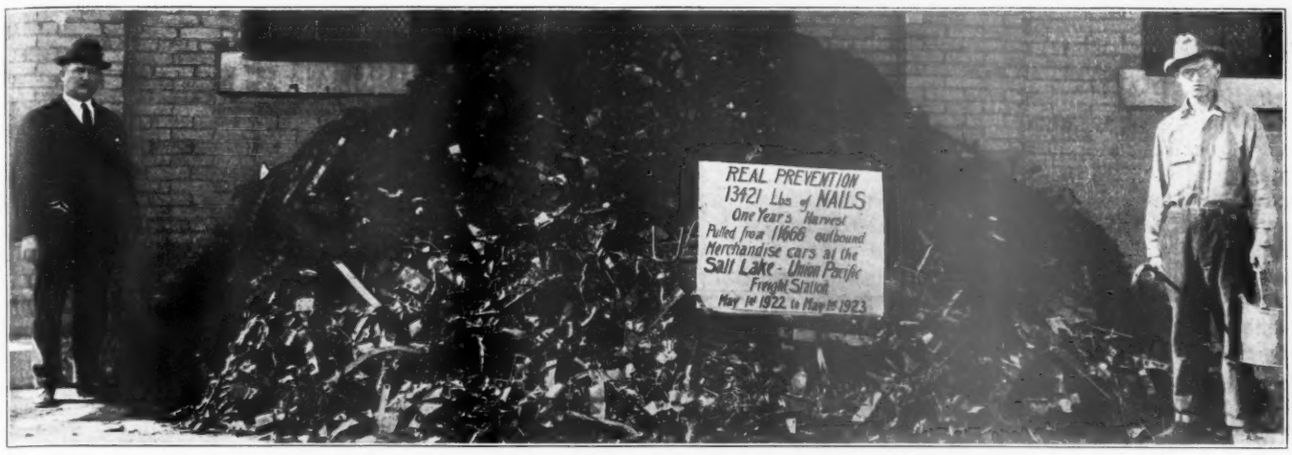
It is set forth also that the problem of coal transportation requires that persistent efforts be made to prevent the diversion of any part of the open-top car supply from coal to other commodities during car shortage periods, as has been the case in the past.

Another cause contributing to coal transportation shortage was said to be that the coal loading railroads are called upon to furnish more than their share of the open-top cars and that their connections are keeping on their lines a considerable percentage of coal cars which, if promptly returned, would greatly relieve the shortage of cars for loading coal. This situation would not continue long if the connecting railroads owned open-top cars of their own in proportion to their share of the coal traffic, and did not divert them to transporting other commodities.

Not only car supply, but the average time required for a coal car to make a round trip from the mine to market and back to the mine directly affects transportation efficiently in the coal trade, the brief points out. The round trip time depends directly on the quantity of motive power available. As in the case of other facilities, it was pointed out, an increase in the supply of motive power commensurate with the needs of the nation cannot be expected if a policy of excessive and confiscatory regulation of the railroads is followed.

Attention was called to the disruption of the transportation systems, and therefore to the coal industry, because of strikes by railroad workers. The brief accentuated the need for greater storage of coal, from a nation-wide point of view, to stabilize the transportation factor by reducing the seasonable demand which has long characterized the industry. However, the seasonal demand and cycles of business expansion and depression are said to be small factors compared to the interruptions caused by labor troubles at the mines, with their consequent rush of production before and after strikes and suspensions, which cause acute transportation shortages. The brief concludes with a plea to the public authorities, railroads, operators and consumers to relieve the public of the burden of frequent, extreme, and long-continued transportation shortages.

THE PENNSYLVANIA RAILROAD carried to and from Atlantic City, Ocean City, Wildwood, Cape May and other South Jersey points, over the Labor Day holidays, a total of 208,212 passengers. The period covered by the report is from August 31 to September 3, inclusive. It is the largest holiday passenger movement ever handled to and from the Jersey shore by the Pennsylvania. It breaks the previous high record, made last year, by over 10 per cent. The "bridge trains," from and to Broad street station, carried 41,311 passengers, an increase of 8,509, or 26 per cent over the best previous record. Besides the heavy travel to shore points, the Pennsylvania carried a total of 195,237 passengers between New York and Philadelphia during the holiday period, representing an increase over last year of 20 per cent.

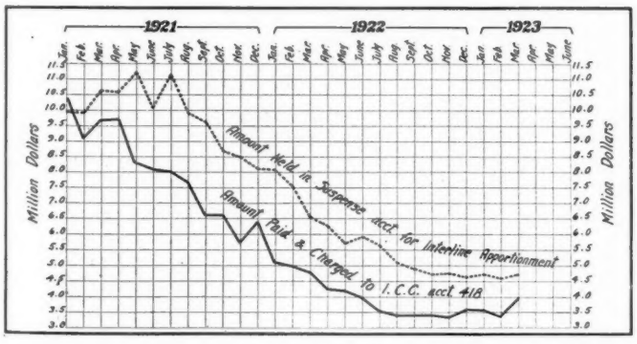


Preventing Claims by Pulling Nails

First Quarter of 1923 Shows Increase in Claims

Campaign of A. R. A. To Reduce Payments Shows Results During the Period in Which it Has Been in Effect

THE NUMBER of claims presented during the first quarter of 1923 was 29 per cent greater than the number presented during the same period of 1922, but less than those during the first quarter of 1921. The increase over 1922 may be attributed in part to an increase of 34 per cent in the number of tons of freight handled in 1923 over the same period in 1922. The number of claims filed per



Amount of Loss and Damage Claims Paid and Held in Suspense

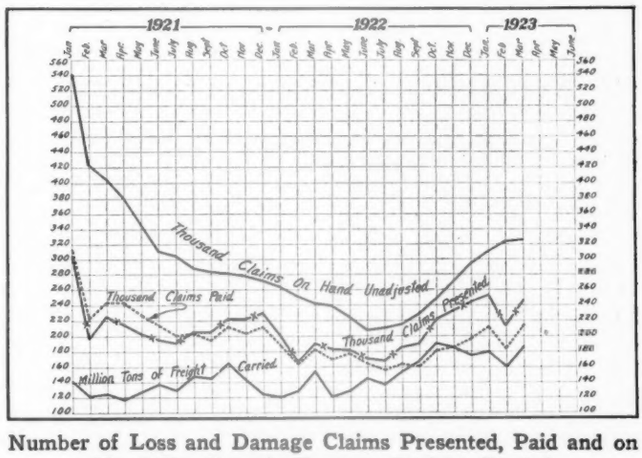
$1,000 of freight revenue during the first quarter of 1923 was 0.66 compared with 0.60 for the first quarter of 1922 and 0.79 for 1921. The number of claims filed per 1,000 tons of revenue freight carried was 1.36 compared with 1.37 for the first quarter of 1922 and 1.87 for 1921. The number of claims per 1,000 revenue ton-miles was 0.007 for 1923 and 1922, as compared with 0.010 for 1921.

The claims paid during the first quarter of 1923 amounted to $10,945,127, compared with $14,852,103 during 1922 and $29,264,164 during 1921, or 1 per cent of the freight revenue in 1923 compared with 1.61 per cent in 1922 and 3.16 per cent in 1921. This establishes a new low record for the last 20 years except in 1916, when adjustments fell behind. The payments amounted to $20.70 per 1,000 tons of revenue freight carried as contrasted with $36.65 for 1922 and $74.92 for 1921, or $11.09 per 1,000 revenue ton-miles against $18.87 for 1922 and $40.06 for 1921.

The following table shows the amount of claim payments and the ratio to gross freight revenue since 1914:

Year	Payments	Ratio to gross freight revenue	Year	Payments	Ratio to gross freight revenue
1914.....	$33,671,219	1.59%	1919.....	$109,587,174	2.95%
1915.....	29,528,016	1.49	1920.....	119,833,127	2.78
1916.....	22,738,893	0.95	1921.....	92,276,319	2.36
1917.....	35,079,757	1.24	1922.....	45,956,566	1.15
1918.....	55,852,797	1.62	1923..... (first quarter)	10,945,127	1.00

Among the commodities on which claims have been reduced to a marked degree is that classed as meats, packing house products, poultry, game and fish, claims on which amounted to $4,019,945 in 1921. The effort made by shippers to reduce these claims is illustrated by Swift & Company, which shipped about 65,000 carloads of fresh meat last year and on which claims for loss and damage due to



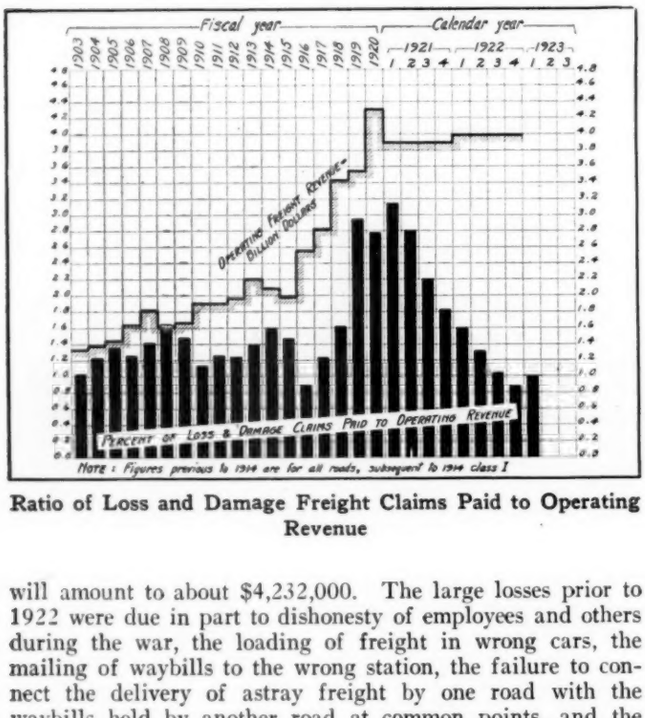
Number of Loss and Damage Claims Presented, Paid and on Hand Unadjusted—Revenue Freight Carried

negligent transportation amounted to only 60 cents per car, excluding cars wrecked. All cases of damage on commodities shipped by this company, existing at the time of delivery to consignee, are reported to a "bad-order" committee consisting of representatives of all interested departments and the elimination of a large part of the losses and

damages formerly attending the transportation of this company's products may be credited to the committee's study of the causes of irregularities and damage to meat products in transit.

The reduction in claims for loss and damage to eggs is another striking example. Claims, which amounted to approximately $1,250,000 in 1920, have been reduced to such extent that the losses for the first quarter of 1923 are at the rate of only $450,000 for the year. This reduction is helped somewhat by a decline of 13 per cent in prices at the farm, but is counteracted by an increase of seven per cent in traffic. The decrease in claims has been brought about largely by the campaign of the Freight Claim Division of the A.R.A. to educate shippers in the proper methods of loading and packing. Reports from the largest shipper of eggs in the country reported damage in only four cars in every 1,000 shipped during 1922, while several others have shipped 100 to 300 carloads during the same year without any damage.

Loss of entire packages has been reduced to a greater extent than any other item, being cut down to $5,026,332 in 1922. In 1914 these claims constituted 15.9 per cent of all claims paid and amounted to $5,156,318. During the first quarter of 1923 the ratio was reduced to 9.7 per cent, and if the same ratio is maintained throughout the year the claims


Fiscal year
Calendar year
1903 1904 1905 1906 1907 1908 1909 1910 1911 1912 1913 1914 1915 1916 1917 1918 1919 1920
1921 1922 1923
1 2 3 4 1 2 3 4 1 2 3
Operating Freight Revenue - Billion Dollars
Percent of Loss & Damage Claims Paid to Operating Revenue
Note: Figures previous to 1914 are for all roads, subsequent to 1914 class I

Ratio of Loss and Damage Freight Claims Paid to Operating Revenue

will amount to about $4,232,000. The large losses prior to 1922 were due in part to dishonesty of employees and others during the war, the loading of freight in wrong cars, the mailing of waybills to the wrong station, the failure to connect the delivery of astray freight by one road with the waybills held by another road at common points, and the failure to require the surrender of bills of lading or other documents in proof of ownership of freight arriving astray. The conditions resulting from these causes were considered by district claim conferences and the committee on freight claim prevention, and as a result circular F.C.D. 105—"Uniform methods of handling over, excess and astray freight and matching against shorts at destination points" was issued on February 10, 1922. The principles embodied in this circular have since been put into effect at practically all points reached by more than one railroad.

The campaign of the Freight Claim Division of the A.R.A. to introduce the use of wire and strap binding has met with such success that checks made by the Freight Container Bureau showed that 13 per cent of all wood boxes were bound with wire or strap during the spring of 1923, as compared with 6.5 per cent in the fall of 1922. Checks made on merchandise cars in all sections of the country show that strapping has had a marked effect in reducing loss and damage to merchandise freight.

Although the reduction in the claims resulting from protruding nails and tin in cars cannot be measured definitely, an idea of the importance of their removal from cars may be obtained by noting the quantity of nails that have been removed and recorded by companies that have conducted nail pulling campaigns. In response to a circular issued by the Freight Claim Division of the A.R.A. in 1922 the local freight agents association of St. Louis instigated a nail pulling campaign in which the 10 roads that kept a record removed 49,578 nails and 156 pieces of tin during the month of October, 1922. The Chicago & North Western, in its campaign to prepare cars properly, kept a record for four months, which showed that 18,000 lb. of nails were removed from cars during that time at St. Paul, Minn. This company has found that 85 per cent of the claims due to improper reparation of equipment are due to protruding nails. The New York Central pulled 66 lb. of nails and iron straps from one car at one station. Another road reports that a check of 639 cars showed that 10,155 sacks of flour were damaged by nails before it started its nail pulling campaign. The Union Pacific pulled 1,203 lb. of nails from May 1 to September 30, 1921, and removed 13,653 lb. of nails from 17,698 cars from June 1, 1919, to September 30, 1921. From June, 1919, to and including April, 1923, the Union Pacific local freight station at Salt Lake City removed protruding nails from the inside of 44,285 outbound merchandise cars and sold 29,743 lb. of nails as junk.

New Car Loading Record

WASHINGTON, D. C.

REVENUE FREIGHT CAR LOADING again broke all previous records during the week ended August 25, when the total was 1,069,932 cars. This is 28,000 more cars than were loaded during the week of the previous high record for this year, that of July 28, and was over 50,000 cars in excess of the record established in the fall of 1920. As compared with the corresponding week of last year, there was an increase of 190,030 cars and as compared with the corresponding week of 1921 the increase was 241,049. As compared with the corresponding week last year, there was an increase of 92,394 cars in coal loading, but the loading of coal also showed an increase of 43,563 cars as compared with 1921. There was also an increase of 41,092 cars in the loading of miscellaneous freight, which amounted to 361,840 cars. The loading of grain showed a considerable increase over recent weeks, amounting to 54,950 cars.

Despite the fact that loading is the heaviest in history, the railroads on August 22 had 74,917 surplus freight cars in good repair and immediately available for service if necessary, while at the same time the reported shortage in freight cars was only 7,690 cars. Compared with August 14, the number of surplus freight cars was a decrease of 3,487, while, compared with the same previous date, there was also a decrease of 625 cars in the reported shortage. Surplus box cars on August 22 totaled 57,196, an increase of 248 within approximately a week. The majority of these box cars, however, are now being held by the carriers in the grain originating territories and will be absorbed in the near future as the grain movement becomes heavier. Surplus coal cars in good repair totaled 5,498, a decrease of 795 compared with the number on August 14. Reports also showed 2,592 surplus stock cars, a decrease within a week of 1,330, while there was also a decrease within the same period of 1,545 in the number of surplus refrigerator cars which brought the total to 8,591.

Out of 2,280,440 freight cars on line, 188,635, or 8.2 per

cent, were in need of repair on August 15. This was a decrease of 379 cars under the number in need of repair on August 1, at which time there were 189,014, or 8.3 per cent. Of the total number, 43,860, or 1.9 per cent, were in need of light repair, 588 less than on August 1, while 144,775, or 6.3 per cent, were in need of heavy repair. This was an increase of 209 over the number in need of such repair at the beginning of the month.

From January 1 to August 15, this year 103,374 new freight cars were placed in service by the railroads including 41,982 coal cars, 41,712 box cars and 13,149 refrigerator cars. Of this number, 6,424 were placed in service during the first 15 days in August. The railroads on August 15 also had on order 80,535 new freight cars, with deliveries being made daily. Of the new freight cars on order, 31,946 were coal cars, 36,122 box cars, and 8,252 refrigerator cars. They also placed in service from January 1 this year to August 15 a total of 2,364 new locomotives, of which 143 were delivered during the first 15 days in August. In addition they had on August 15, 1,674 new locomotives on order.

Locomotives in need of repair on August 15 totaled 11,571 or 18.1 per cent of the number on line, according to reports filed with the Car Service Division. This was an increase of 16 locomotives over the number in need of repair on August 1, at which time there were 11,555, or 18.1 per cent.

Of the total number on August 15, 10,487 or 16.4 per cent were in need of heavy repair, an increase of 117 over the number at the beginning of the month and 1,084 or 1.7 per cent were in need of light repair, which was a decrease of 101. The railroads on August 15 had 2,667 locomotives in storage ready to be used whenever traffic conditions warrant.

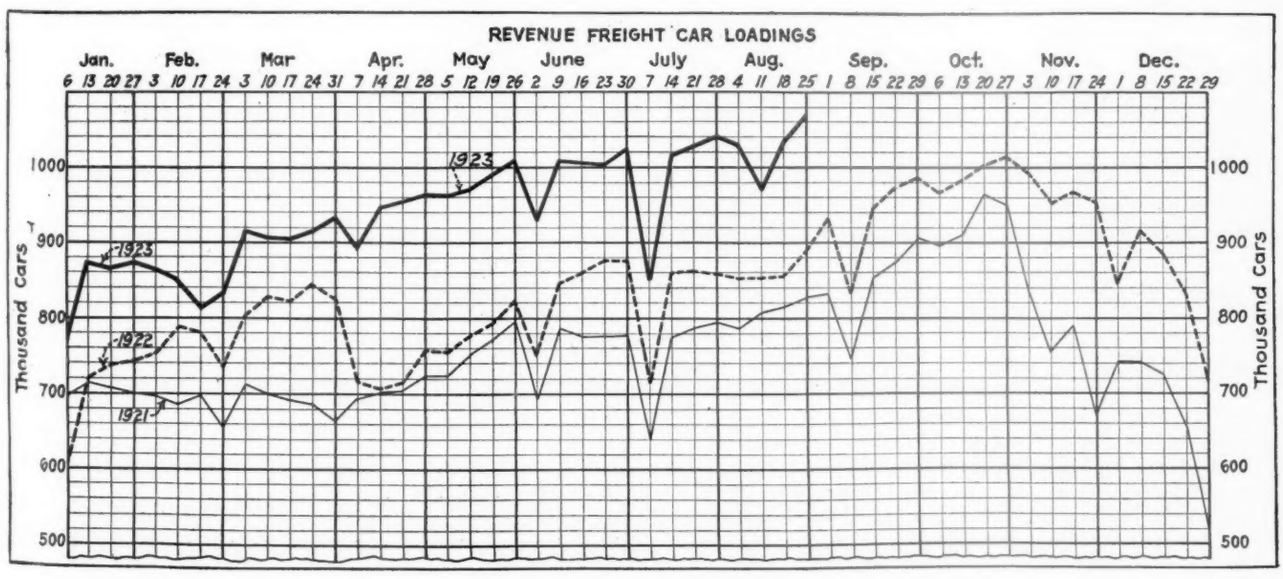
This was an increase of 117 over the number in storage on August 1.

REVENUE FREIGHT LOADED

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO, WEEK ENDED SATURDAY, AUG. 25, 1923

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L. C. L.	Miscellaneous	Total revenue freight loaded	Corresponding period 1922	Corresponding period 1921
Eastern	1923	10,042	3,453	58,392	3,590	6,314	8,933	67,536	99,028	257,288	.....	.....
	1922	9,665	3,124	20,024	1,224	5,699	6,195	66,157	95,657	.....	207,745	204,123
Allegheny	1923	3,862	3,098	61,646	6,387	3,856	14,228	49,812	87,985	230,874	.....	.....
	1922	3,534	2,947	32,760	4,570	3,221	11,406	48,485	78,453	.....	185,376	165,690
Pocahontas	1923	355	308	29,206	622	1,884	182	6,326	5,001	43,864	.....	.....
	1922	200	214	20,547	263	1,109	87	4,604	2,580	.....	29,604	27,218
Southern	1923	4,704	2,068	24,724	1,108	24,199	1,848	38,515	39,007	136,173	.....	.....
	1922	3,739	2,306	19,935	709	18,766	992	34,199	33,003	.....	113,649	109,407
Northwestern	1923	16,333	8,768	8,421	1,258	19,847	49,688	31,206	39,752	175,273	.....	.....
	1922	17,315	7,776	4,195	1,045	15,766	44,014	28,584	33,897	.....	152,592	129,854
Central Western	1923	14,950	14,581	15,617	347	12,427	2,578	35,714	60,676	156,790	.....	.....
	1922	15,326	12,423	9,679	413	8,997	2,257	33,902	55,752	.....	138,749	128,178
Southwestern	1923	4,824	4,137	5,070	201	9,430	461	15,156	30,391	69,670	.....	.....
	1922	4,370	2,932	3,542	159	6,297	444	13,037	21,406	.....	52,187	64,413
Total, West. Districts	1923	36,007	27,486	29,108	1,806	41,704	52,727	82,076	130,819	401,733	.....	.....
	1922	37,011	23,131	17,416	1,617	31,060	46,715	75,523	111,055	.....	343,528	322,445
Total, all roads	1923	54,950	36,413	203,076	13,513	77,957	77,918	244,265	361,840	1,069,932	.....	.....
	1922	54,149	31,722	110,682	8,383	59,855	65,395	228,968	320,718	.....	879,902	.....
	1921	58,838	26,919	159,513	4,631	47,408	31,912	222,455	277,207	.....	.....	828,883
Increase compared	1922	801	4,691	92,394	5,130	18,102	12,523	15,297	41,092	190,030	.....	.....
Decrease compared	1922	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Increase compared	1921	.....	9,494	43,563	8,882	30,549	46,006	21,810	84,633	241,049	.....	.....
Decrease compared	1921	3,888	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Aug. 25	1923	54,950	36,413	203,076	13,513	77,957	77,918	244,265	361,840	1,069,932	879,902	828,883
Aug. 18	1923	52,521	33,150	189,073	13,587	77,299	80,759	241,238	348,114	1,035,741	846,266	815,147
Aug. 11	1923	46,149	30,807	177,259	12,934	73,348	81,829	227,685	323,061	973,162	842,690	808,269
Aug. 4	1923	52,871	31,480	190,531	13,458	76,095	83,507	240,455	344,723	1,033,130	842,663	786,178
July 28	1923	53,160	31,849	194,546	14,274	77,799	83,633	240,046	345,737	1,041,044	848,858	795,432

Compiled by the Car Service Division, American Railway Association.



General Foremen Hold Convention in Chicago

James C. Davis, Director General of Railroads, Addresses Meeting—A Plea for Private Operation

THE SEVENTEENTH ANNUAL CONVENTION of the International Railway General Foremen's Association was held at the Hotel Sherman, Chicago, September 4 to 7, inclusive. Approximately 100 members and guests were in attendance at the opening session, which was presided over by J. B. Wright, president of the association. After the usual opening exercises President Wright spoke in part as follows: The International Railway General Foremen's Association will find its efforts valuable largely in the extent to which it can induce mechanical department supervisory officers to co-operate with officers in other branches of railroad service. We must feel our common responsibility in relation to the one thing that railroads have to sell—transportation. There is no doubt that our responsibilities are greater and our daily problems more complex than they were previous to the labor trouble of last year, and the fact that equipment in general on the majority of railroads is in better better condition today than it was previous to the strike would indicate that these problems are being solved. I do not believe there is any one thing more important to the successful operation of the mechanical department of the railroads than that of proper and efficient supervision. In selecting subordinate supervisors, careful and serious consideration must be given to their ability. To be a successful foreman at the present time requires many qualifications which were given little consideration a few years ago. One of the most important of the general foremen's tasks is the proper training of subordinate foremen. Being responsible for the output and efficient operation of railroad repair shops requires a man capable of surmounting any obstacle no matter what it may be. Due to direct contact with employees, the foreman's attitude toward them must be such that he will not only gain but retain their absolute confidence. To the employees, the attitude of the company is reflected through the shop foremen and if foremen practice unfairness in dealing with them, the loyalty which is needed most on the railroads today will be lost. Fairness and firmness will win and hold the respect of most men we may come in contact with. The railway executives are asking for more mileage, and an improvement of the bad order cars and locomotive situation which necessitates speeding up in every department. Much has been accomplished along these lines by stirring up real enthusiasm throughout the entire railroad organization. The real problem now is to see that this enthusiasm does not die down but that every railroad employee is spurred on to greater activity.

Following the president's address, the meeting immediately took up the consideration of Topic 1 and listened to a paper on "Shop Efficiency, Locomotive and Car Department." Particular attention was given in this paper to the methods of training and developing apprentices, also the relation of foremen and employees and methods of increasing the efficiency of supervisors and employees. Further details regarding the papers presented and the discussion will be printed in a subsequent issue.

On the second day of the convention, the following officers were elected for the ensuing year: President, G. H. Logan (Chicago & North Western); first vice-president, H. E. Warner (New York Central); second vice-president, C. A. Barnes (Belt Railway of Chicago); third vice-president, B. L. Davis (Chesapeake & Ohio); fourth vice-president, F. M. Ahearn (Bessemer & Lake Erie); secretary-treasurer, William Hall (Chicago & North Western). The following were elected members of the Executive Committee: C. F. Baumann (Chicago & North Western), M. H. Westbrook (Grand Trunk), M. R. Benson (Michigan Central), William Mulcahy (Baltimore & Ohio), and W. F. Lauer (Chesapeake & Ohio).

Address by James C. Davis

On the second day of the convention an address was delivered by James C. Davis, Director-General of Railroads, on the subject of "the Responsibilities of American Citizenship," of which the following is an abstract:

Ever since the dawn of history there have been economic disturbances known in every-day language as "Good Times" and "Bad Times." Every period of depression brings into existence a new set of amateur statesmen who have easy and specious remedies for all the ills of the body politic.

The World War, with its prodigal destruction of human life and existing property and property values, the wiping out of ancient forms of government and the deposition of Kings, Emperors and Czars, has set abroad in every land a feeling of unrest, dissension and controversy such as the world has never seen. Happily, America is the least affected, but even here, and especially in the great Middle West, we find agitation which has for its purpose the destruction of the right of ownership of private property and the advocacy of a concerted plan to take private property for a public use without making any compensation to the owners.

May I briefly apply to the national transportation problem the proposed reforms suggested by vociferous but inexperienced statesmen who springing up over night, can on demand produce ready made plans warranted to settle all of our national difficulties? The United States today has the most efficient rail transportation system in the world. Even at present rates, persons and commodities are transported for less compensation than in any other civilized country on the globe.

This vast system has been largely constructed within the memory of many men and women now living. In 1870, five years after the close of the Civil War, there were some 50,000 miles of railroad in existence. Since that date, covering a period of a little more than fifty years, more than 200,000 miles of railroad with necessary equipment and terminals, have been constructed.

The money necessary to create this wonderful system has, all except for comparatively small donations by various states and national government, been furnished by private individuals, who invested their private funds in this great and necessary improvement, which has been the controlling factor in the country's growth and development.

The value of this property, resulting from the construction of this vast plant, as fixed by the tribunal created by law, is now in excess of $19,000,000,000.

It is quite accurately estimated that the stock and bond holders of the American railroads aggregate over two million. It is a matter of note that small investors make up the great aggregate; investors who have ordinarily paid full value for their holdings, under laws recognizing such carrier obligations as private property. Persons who have purchased these securities have a private ownership in them, just as a man has who owns a home, an automobile, or a farm, and so long as we have a constitution and courts to administer the law of the land, this private ownership will be recognized and protected.

Every one concedes that an adequate system of transportation, highly maintained and efficiently operated, is absolutely essential to any sort of national prosperity and progress.

Railroads cannot be efficiently operated unless their income is sufficient to pay operating expenses, fixed charges and a reasonable return on the investment. No political legerdemain, no act of Congress or of a state legislature, can change or alter this necessity. Men will not work unless their wages are paid; coal and materials must be paid for; capital will not invest unless promised a fair return.

These are facts the existence of which no man can dispute and they create the conclusion that the income must be sufficient to pay these charges and to properly maintain the plant or the railroads

cannot be operated as privately owned property and the only alternative will be public ownership and public operation.

The remedy proposed is to cut the value of the property in two, on the alleged theory that outstanding railroad stock represents eight or ten billion dollars of water. This charge is made without any sort of consideration of the undisputed facts and would destroy the entire value of all of the outstanding stock. It would violate every provision found in our national and state constitutions protecting the rights of private property.

If by an act of Congress or the legislature you can destroy one-half of the value of the railroads, why stop at one-half? Why not destroy it all? If you can reduce or destroy the value of railroad property owned by private individuals by a legislative act, why not apply the same rules to water, gas, electric light and street railway property, and thus reduce the charges which the public pay for these services? If this step is taken, by the same logic the government could either destroy the value or make a common ownership of farms, homes, factories and all sorts of tangible property.

In none of these suggested cases from the railroads down can this be done so long as we have a government functioning under a constitution protected by courts that respect the rights of private property.

As a matter of fact, the outstanding stock and bonds of railroads have nothing to do with rates. Rates are fixed upon the basis of "a fair return upon the reasonable value of the property at the time it is used by the public" and this value is not fixed by the owners of the property, but by a tribunal created by law.

Before our present form of government is destroyed, should there not be presented a better and a definite plan as a substitute? Has not our existing form of government been a success? Is there a government or a land in the whole wide world where the people as a whole have such opportunities to enjoy life, where men can so effectively enjoy the fruits of their own labor, where advancement and promotion wait only on efficiency and industry?

The point I want to emphasize is that the right of private ownership and the enjoyment of private property, subject only to the reasonable restrictions necessary in protecting the public as a whole, is the inherent and controlling principle of government, and that at this time this right is the subject of direct attack. It is by virtue of this right that contracts of all kinds are protected and enforced; it is by virtue of this right that men can demand and recover the just compensation that must be paid for their labor; it is in recognition of this right that men own and control their homes, their farms, their factories and all other property, and when this right is destroyed, the government ceases to function and is a failure.

No governmental authority can be exercised over a great nation like ours, with its one hundred ten million people, its immense areas extending from ocean to ocean and its many diverse and widely scattered interests without differences of opinion and the existence of some abuses. The correction of wrongs should be made by intelligent consideration, after ascertaining the real facts, rather than by following the leadership of men who promise what they cannot perform and who appeal to passion and prejudice upon distorted and untrue statements of fact.

Efficient transportation is essential to any sort of national prosperity and some degree of patience should be exercised to enable the carriers, under the existing detailed governmental supervision, to work out as nearly as possible an ideal transportation system. A system which, based on efficient and economical management, will furnish prompt, adequate and effective service for the public at rates that are reasonable and will permit the free interchange of commodities essential to prosperous commercial life, pay to all employees sufficient compensation to enable them to live and rear their families in accordance with fair and civilized standards of living, and return to the owners of the property a just and fair compensation on the value of the property engaged in the service.

Exhibitors

Over 50 members of the Association of Railway Supply Men were exhibitors at the convention. The list of these companies with their representatives follows:

Air Reduction Sales Company, New York.—Oxygraph and radiagraph, oxygen and acetylene, welding and cutting apparatus. Represented by H. A. Hocking, B. N. Law, Reuben T. Peabody, G. E. Phelps and G. Van Alstyne.

American Arch Company, New York.—Represented by A. W. Clokey.

American Bolt Corporation, Boss Nut Division, Chicago.—Nuts, bolts and rivets. Represented by J. W. Fogg and A. W. Maclean.

American Machinist, New York.—Copies of American Machinist. Represented by W. V. Wallace and Howard Campbell.

Armstrong Brothers Tool Company, Chicago.—Tool holders, ratchet drills, dogs, clamps, wrenches, stocks, dies and pipe vises. Represented by P. L. Armstrong and John Sutton.

Ashton Valve Company, Boston, Mass.—Wheel press recording gage, recording gages, safety valves, dead weight tester, driving wheel quartering gage, inspector's testing and proving outfit, air pump swab holders, quadruplex air brake gage, steam gages, double dial steam gage, safety valves, protected dial pressure gage and steam gage. Represented by Charles Gaston, J. F. Gettrust and Ernest Nordstrom.

Badeker Manufacturing Company, Chicago.—Metallic piston rod and valve stem packing. Represented by J. W. Stack and J. P. McKinley.

Baldwin Locomotive Works, Philadelphia, Pa. Represented by R. J. Schlacks and W. H. Evans.

Barco Manufacturing Company, Chicago.—Power reverse gear, metallic car connections, metallic engine and tender connections, crosshead, smoke box blower fittings, yard and station steam heat connections, blower and blow off connections for roundhouse, flexible joints for air reservoir, distributing valves, headlight dynamos, etc. Represented by F. N. Bard. C. L. Mellor, A. S. Lewis, F. H. Stiles, W. J. Behlke and C. O. Jenista.

Borden Company, Warren, Ohio.—Pipe threading tools, special die stock for threading air lines and superheater stock. Represented by V. M. Gaspar.

Carbo-Oxygen Company, Pittsburgh, Pa.—Cutting and welding apparatus and paint burning torch. Represented by F. S. Austin, V. F. Schrubb and J. H. Wright.

Clark Equipment Company, Buchanan, Mich.—High speed twist drills, reamers, countersinks, flue cutters and lathe tools. Represented by C. O. Montague and W. Nochumson.

Cleveland Pneumatic Tool Company, Cleveland, Ohio.—Represented by C. J. Albert.

Cleveland Steel Tool Company, Cleveland, Ohio.—Punches, dies, rivet sets, chisel blanks, portable electric drills, reamers, grinders, tool post grinders, floor grinders and bench drilling stands. Represented by H. W. Leighton.

Cleveland Twist Drill Company, Cleveland, Ohio.—High speed drills and reamers. Represented by H. S. White, O. B. Hansen, W. L. Evans and L. P. Farnum.

Crucible Steel Company of America, Pittsburgh, Pa.—Represented by F. Baskerfield.

Dearborn Chemical Company, Chicago.—Represented by G. R. Carr, I. L. Beebe, O. H. Rehmeyer and N. S. Dunn.

Detroit Lubricator Company, Detroit, Mich.—Locomotive lubricator, automatic flange oiler, automatic exhaust nozzle cover, transfer filler. Represented by A. G. Machesney and C. H. Perrine.

Edna Brass Manufacturing Company, Cincinnati, Ohio.—Force feed lubricator, hydrostatic lubricator, water column and injectors. Represented by H. A. Glenn and F. S. Wilcoxen.

Forster Paint & Manufacturing Company, Winona, Minn.—Locomotive cement and front end paint. Represented by Helen J. Caswell.

Garlock Packing Company, Palmyra, N. Y.—Fibrous packings for general railway use. Represented by C. W. Sullivan and J. L. Fisher.

Goddard & Goddard Company, Detroit, Mich.—Milling cutters and reamers. Represented by C. H. Wallace and C. S. Goddard.

Grip Nut Company, Chicago.—Grip nuts. Represented by A. C. Woods, Jr., and W. F. Skeer.

Hunt Spiller Manufacturing Corporation, Boston, Mass.—Valve bull rings, piston heads, piston bull rings, crosshead shoes, cylinder packing, piston valve packing, cylinder bushings and cylinder packing, air pump bushings, shoes and wedges, floating rod bushings. Represented by V. W. Ellet and E. J. Fuller.

Huron Manufacturing Company, Detroit, Mich.—Washout arch tube plugs. Represented by E. H. Willard, S. Elstone and W. H. Bentley.

E. S. Jackman & Co., Chicago.—Tool steel. Represented by H. S. Norman and E. T. Jackman.

Jenkins Brothers, New York.—Valves. Represented by George Royal and C. B. Yardley.

Johns-Manville, Inc., New York.—Pipe and boiler insulation, locomotive and shop packings and gaskets, steam traps, high temperature cement. Represented by J. C. Younglove, P. C. Jacobs, H. J. Crowe, L. S. Wilbur and P. R. Austin.

Locomotive Appliance Company, Toledo, Ohio.—Steam distribution system, fire-door, power reverse gear. Represented by C. J. Pillard and H. A. Varney.

Locomotive Lubricator Company, Chicago.—System of locomotive force feed lubrication. Represented by W. J. Schlacks and C. W. Rudolph.

Locomotive Stoker Company, Pittsburgh, Pa.—One-third size working model of locomotive stoker. Represented by A. N. Wiltsie, E. F. Milbank, Thomas Baldwin, J. W. Ball and C. F. Kahler.

Madison-Kipp Corporation, Madison, Wis.—Two-feed force feed lubricator and four-feed force feed lubricator. Represented by W. B. Wheeler and A. H. Flanagan.

Manning, Maxwell & Moore, Inc., New York City.—Valves, inspirators, safety valves and gages. Represented by C. L. Brown and C. W. Corning.

Metal & Thermit Corporation, New York.—Welding tools for thermit welds and pipe welding. Represented by H. S. Mann, Fred. Belew and W. H. Moore.

Midgley & Borrowdale, Chicago.—Force feed lubricators, locomotive cooler, drinking fountains, dining car filters, weatherstrip, all-fibre dust-guard and chair brace. Represented by S. W. Midgley and J. M. Borrowdale.

Nathan Manufacturing Company, New York.—Lubricators, injectors, boiler checks and water columns. Represented by J. E. Brandt and Richard Welsh.

The National Malleable Castings Company, Cleveland, Ohio.—Journal boxes, couplers, coupler pockets, draft gears and wrecking hook. Represented by G. R. Rasmussen, R. W. Chambers, L. S. Wright, T. W. Aishton and C. H. Krakan.

National Railway Devices Company, Chicago.—Radial fire door and vertical fire door. Represented by J. G. Robinson and E. J. Gunnison.

Nye Tool & Machine Works, Chicago.—Dies, stocks, vises and knurled cutter wheels. Represented by John A. Cotter.

Ohio Injector Company, Chicago.—Injector, non-lifting injector, lubricator, automatic flange oiler, automatic drifting valve, low water alarm, boiler check and stop valve, hose strainer and fire jet. Represented by A. C. Beckwith, F. W. Edwards and W. H. Barker.

Okadee Company, Chicago.—Blow-off valve, automatic cylinder cock, front

end hinges and water glass protectors. Represented by A. G. Hallingshead, G. S. Turner, W. H. Heckman, F. G. Zimmerman and A. D. Ballantine.

O'Malley-Beare Valve Company, Chicago.—Multiple valves and car and engine brasses. Represented by J. N. Gallagher, J. E. Brown, J. J. Conners and J. M. Pigott.

Paxton-Mitchell Company, Omaha, Neb.—Piston rod, valve stem and air pump, metallic packing and hand power lathe. Represented by James Paxton, E. L. Chollman and L. J. McConnell.

Pilot Packing, Inc., Chicago.—Semi-metallic packing, grease lubricator, drifting valve. Represented by Joseph Sinkler, Robert Sinkler and E. F. Boyle.

Pratt & Whitney Company, New York.—Hand taps, boiler taps, mud and washout plug taps, locomotive reamers, expansion reamers, punches and dies, milling cutters, ratchet wrenches, die stock sets, metal saws, gear cutters, bridge reamers and curvex cutters. Represented by F. A. Armstrong and P. C. Renno.

Pyle-National Company, Chicago.—Turbo generators, sheet metal and cast aluminum alloy headlight cases, 10-in. to 14-in. flood lights of aluminum alloy construction; 10-in. cast aluminum headlight case for switching locomotives. Represented by J. W. Johnson, William Miller, W. T. Brotherton and T. J. McGinnis.

Racine Tool & Machine Company, Racine, Wis.—Metal-cutting machines. Represented by J. M. Jones, M. E. Erskine and R. E. Fuller.

Rivet Cutting Gun Company, Cincinnati, Ohio.—Rivet busters. Represented by J. M. Crowe, H. C. Doran, J. C. Little.

Standard Stoker Company, New York.—One-third size working model of locomotive stoker. Represented by C. T. Hansen, S. I. McQuilken, F. P. Roach and C. P. Petersen.

Sunbeam Electric Manufacturing Company, Evansville, Ind.—Air-tight headlight, turbo generator. Represented by H. A. Varney.

Superheater Company, New York.—Represented by G. E. Ryder, F. A. Schaff, R. Ostermann, P. R. Forterfield, Bard Browne and E. J. Drewyour.

Torchweld Equipment Company, Chicago.—Cutting and welding equipment. Represented by J. L. Jensen and W. A. Slack.

United States Metallic Packing Company, Philadelphia, Pa.—Air pump packing, piston and valve stem packing, oil cup, shaker bar, sanders, bell ringer. Represented by J. T. Luscombe, J. C. Weeden and H. E. Hyslop.

Vissering & Co., Harry, Chicago.—Metallic packing, sander, uncoupling lever attachments, bell ringer, bell ringer throttle valve, duplex engineer's valves, type sanders. Represented by G. S. Turner, W. H. Heckman, F. G. Zimmerman and A. D. Ballantine.

Wilmarth & Morman Co., Grand Rapids, Mich.—Drill grinders, surface grinders, universal tool and cutter grinders. Represented by A. Williams and H. L. Saunders.

At the annual meeting of the Association of Railway Supply Men, A. W. Clokey, American Arch Company, was elected president and J. W. Schlacks, Locomotive Lubricator Company, secretary-treasurer. C. L. Mellor, Barco Manufacturing Company, is the retiring president.

Hearing on Sleeping Car Rates and Surcharge

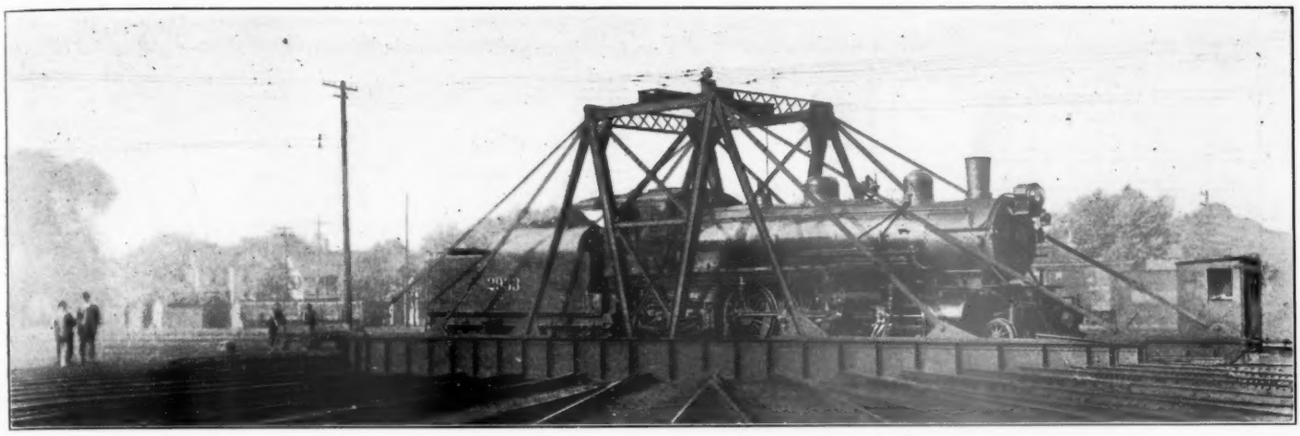
WASHINGTON, D. C.

AN INTIMATION that the Interstate Commerce Commission may order the abolition of the surcharge on sleeping and parlor car tickets but provide in some way for the collection by the railroads of an equivalent revenue in some other manner was given by Commissioner Campbell on September 5 at the resumption of hearings in the commission's proceeding of investigation of the rates for sleeping and parlor car service and the contractual relations between the railroads and the Pullman company. Combined with this proceeding is also the complaint of the commercial travelers' organizations asking a removal of the surcharge, which was established by the Interstate Commerce Commission in its general rate advance order in August, 1920, and which has produced approximately $33,000,000 of revenue for the railroads in each of the past two years. Commissioner Campbell asked if the railroads have thought out any method or are prepared to suggest any plan as a substitute for the surcharge plan if the commission should decide that the surcharge should be done away with but that it is necessary for the railroads to receive the amount of revenue involved. He did not ask for an immediate answer, but indicated that the commission would like to hear from the carriers as to what manner or method of collection could be worked out in lieu of the surcharge. Commissioner Campbell also asked whether all the carriers are in accord or whether there is difference of opinion among them as to the advisability of continuing the surcharge and he was informed by counsel for the eastern, western and southern lines, respectively, that in all the conferences on this subject there was no indication of any difference of opinion, but that the carriers were unanimous that the surcharge should be continued. G. S. Fernald, general counsel of the Pullman Company, said that that company is "unanimous" that if the surcharge is to be continued, the railroads should collect it themselves.

The hearing was a continuation of those held in Chicago in June and at Portland, Me., in July. Commissioners Cox and McManamy and Examiner Keeler sat with Commissioner Campbell. The first testimony offered was in response to a question from the commission at a previous hearing as to the experience of railroads that operate their own sleeping cars. G. F. Vivian, of the Chicago, Milwaukee & St. Paul, gave a statement of that company's sleeping car operations for 1921 and 1922, which showed a profit for the two years, exclusive of the surcharge, of approximately $46,000, but he said this was more than wiped out by the fact that their undermaintenance would amount to about $200,000 in 1922 and that various incidental charges against the railroad operations proper had not been figured. C. W. Tilton, assistant general auditor of the Great Northern, testified that that company's loss from the operation of sleeping cars in 1921 was $211,000 and in 1922 was $236,000 and that in June, 1922, when it was decided the company needed additional sleeping cars, a contract was made with the Pullman Company for furnishing equipment for two important lines to the Pacific Coast as preferable to having the railroad buy additional cars of its own. J. L. Coleman, general attorney of the Atchison, Topeka & Santa Fe, who represented the western carriers, said that this indicated a recognition by the Great Northern, after many years of experience in operating its own sleeping cars, of the wisdom of the policy of the other western railroads in making contracts with the Pullman Company. A. L. Conrad, assistant general auditor of the Atchison, Topeka & Santa Fe, gave the results of a check made during the month of November, 1920, showing the average number of passengers per car on its trains in sleeping cars and coaches, respectively. This showed an average of approximately 25 coach passengers per car as against about 12 per car in Pullman sleeping cars. He said the Pullman occupancy is now about the same as it was at that time, although the coach occupancy is now lower. A. H. Plant, assistant to the president of the Southern, presented some statistical exhibits covering passenger travel in the south, which showed that during the first six months of 1923 on five Class I southern systems the passenger revenue, excluding the surcharge, had increased 14 per cent as compared with the corresponding period of 1922, while the surcharge collected had increased 23½ per cent.

E. L. Bevington, chairman of the Transcontinental Passenger Association, and W. C. Wishart, comptroller, New York Central Lines, were recalled for cross-examination by counsel for the commercial travelers. They pointed out that if the surcharge were removed the railroads would have to receive an equivalent amount of revenue from some other source because they are not yet earning an adequate return. Mr. Wishart said that the surcharge is probably the most justifiable charge the railroads could make and that even if the railroads of one group were earning enough more than the prescribed rate of return so that a reduction in their revenues would be warranted, the reduction should be made on some other class of traffic.

SIR HENRY THORNTON, president of the Canadian National will establish headquarters at Winnipeg, Man., in addition to his eastern headquarters at Montreal, to facilitate the transaction of business on the western lines.



Turntable at Minneapolis, Minn., Equipped with Friction Drive Tractor

Friction Drive for Turntable Tractors

Outfits Installed by Great Northern Cannot be Damaged by Careless Operation

THE GREAT NORTHERN has recently installed a number of turntable tractors which are so designed that it is practically impossible for a careless operator to injure them. In cases where the design includes a reversing motor, it is not uncommon for the operator to use the reverse for stopping the table or to throw the motor into reverse when it

Fig. 1—Side View of Tractor Cab Showing Control Lever and Motor Starter

is running at practically full speed. To avoid the necessity for balancing the turntable the operators often resort to the practice of loading down the tractor and sanding the rail in an effort to secure the kind of operation that is obtained by twin-span tables equipped with two large motors. Either of these practices means heroic treatment for the motor and sooner or later results in the burning out of the motor.

Construction

The new Great Northern tractor is so designed that it is practically impossible to pile weights on the tractor and even though it were done and the rail sanded, the only effect it would have would be to cause the drive to slip. Furthermore the tractor drive is so arranged that stopping is accomplished by throwing the control lever into reverse and accordingly no damage can be done by any number of sudden reversals.

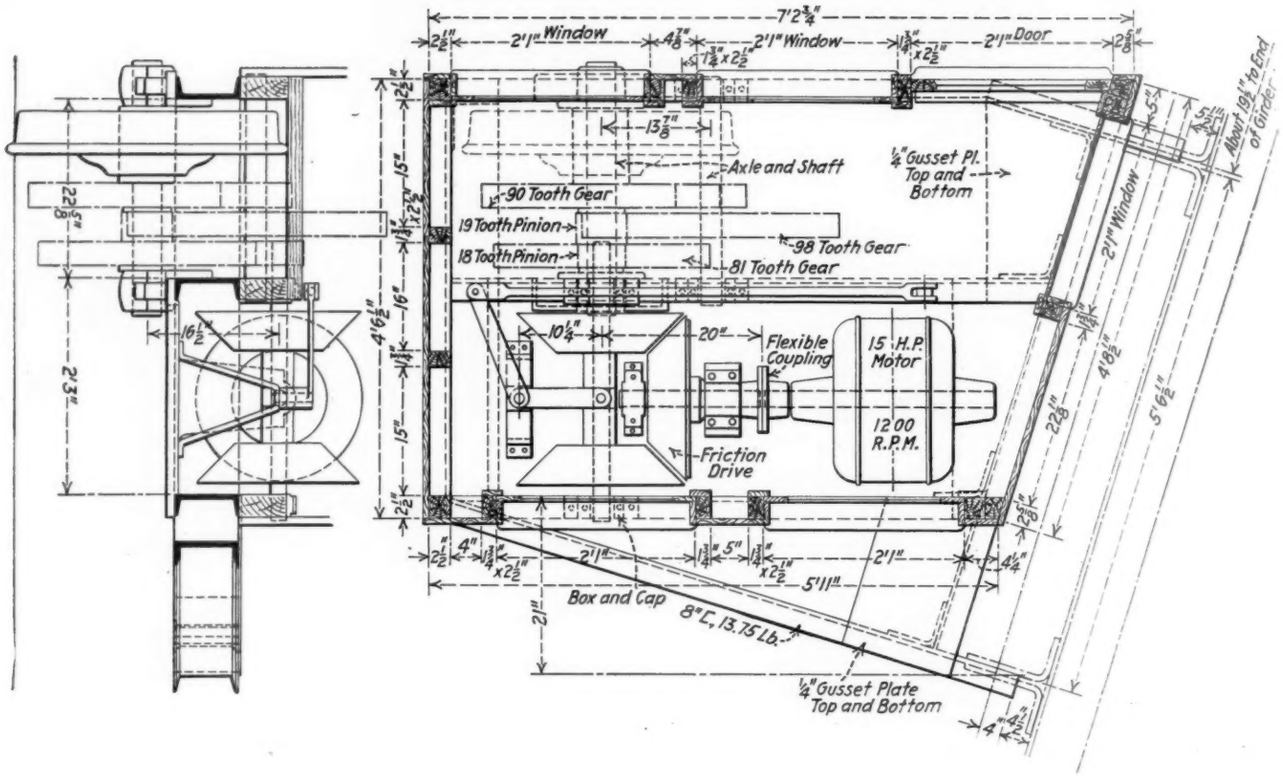
A side view of the operating cab is shown in Fig. 1. The cab is mounted directly over the driving gear. The motor starter and the operating lever can be seen through the open door. The starter is a two-position starting compensator and the motor is a 15- or 25-hp. squirrel cage type induction motor running at 1,200 r.p.m.

The drive is exposed for inspection by lifting the floor boards of the operating cab as shown in Fig. 2. *C* is a fiber cone pulley or wheel which is driven through the flexible coupling *B* by the motor *A*. This pulley has a 7-in. face,

Fig. 2—Flooring of Cab Raised to Show Driving Mechanism

an outside diameter of 21 in., and an inside diameter of 11 in. There is a bearing on each side of the pulley.

E and *D* are iron pulleys which are keyed by a spline or feather key to the countershaft which is keyed rigidly to the pinion *G*. Movement of the operating lever *F* causes the two iron pulleys *D* and *E* to slide back and forth on the countershaft so that either *D* or *E* engages with the fiber pulley *C*.



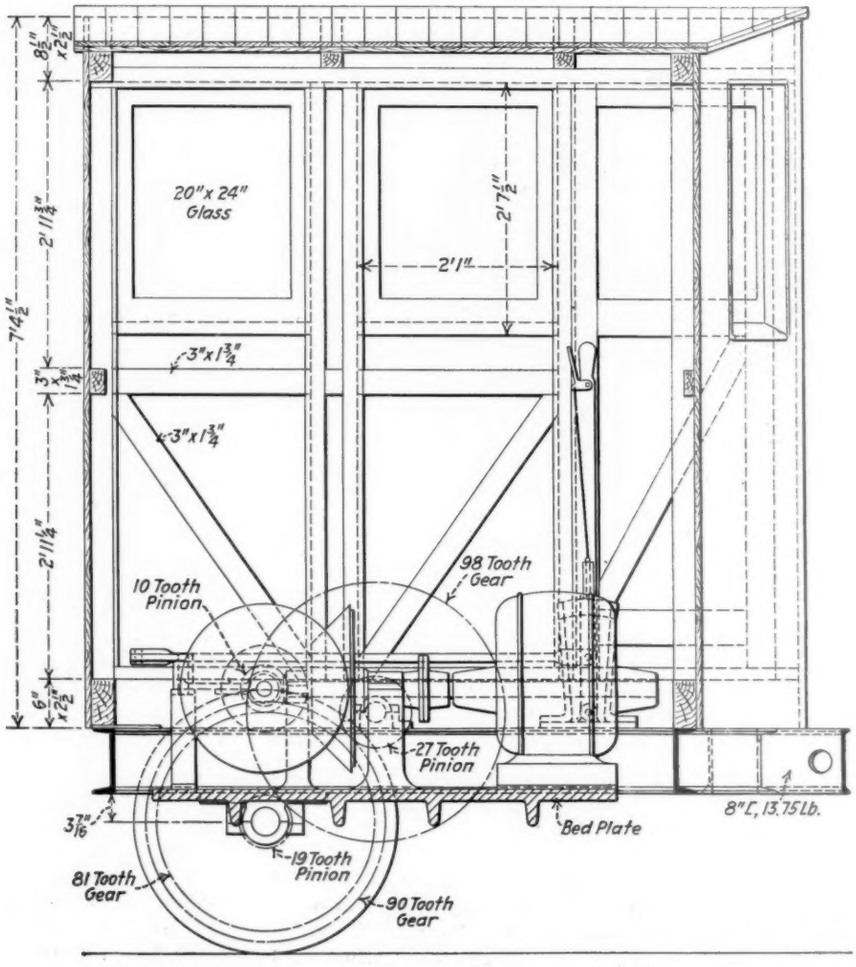


Fig. 4—Some Details of Tractor Construction

This causes the countershaft to rotate in one direction or the other and the motion is carried through triple reduction gears to the driving axle.

The operating levers and the cones are so designed that a normal man cannot exert enough pressure on the lever *F* to overload the motor sufficiently to damage it.

The gears *H* and *K* are both mounted on the axle. *K* is rigidly keyed to the axle and *H* is free to rotate on it. This arrangement of gears permits the use of a narrow cab as shown in Fig. 3 which does not have the tendency of a wider cab to lean toward the center of the turntable pit.

Operation

When the table is to be moved, the operator first starts the motor by means of the compensator. The operating lever is held normally in the neutral position by springs and the motor runs free. If the operator then wishes to move forward so that the tractor pushes against the table, he moves the operating lever *F*, Fig. 2, in that direction. This causes

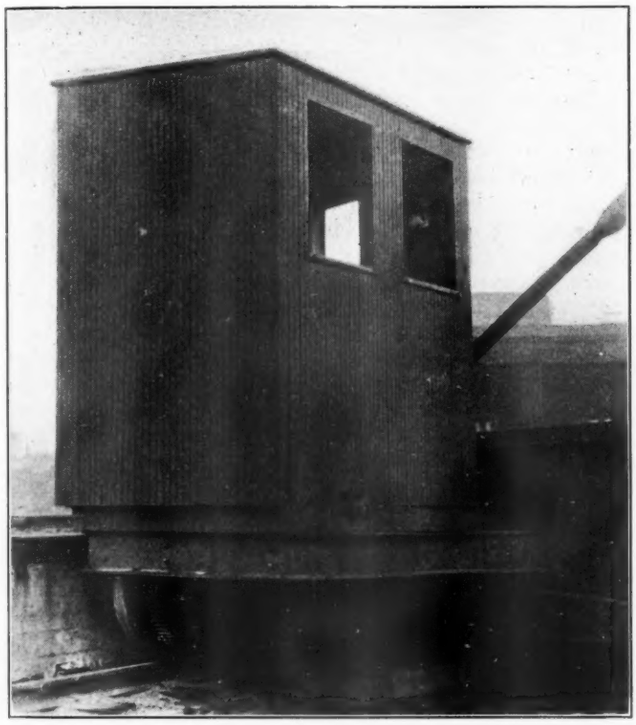


Fig. 3—Mounting Two Gears on the Axle Makes a Narrow Cab Possible

the pulley *E* to engage with *C* and the table starts, gradually picking up speed until there is practically no slip between the two pulleys. When he wishes to stop he simply pulls the operating lever back into the reverse position. This causes pulleys *D* and *C* to engage and as they are rotating in opposite directions they work effectively as a brake. If the operating lever is held in this position long enough, the table of course will reverse.

As might be expected, the pulley *C* wears, but the wear is not excessive. The pulley has an iron frame on which a number of 5/8-in. fiber discs are bolted. As the discs wear down the smallest one is taken off and one of the largest size is added. In this way a disc is worn from a diameter of 21 in. to a diameter of 11 in. before it is taken out of service.

Motors running at 900 r.p.m. have been tried for this service but have been found unsatisfactory, on account of the slower speed of the friction wheels. With 1,200 r.p.m. motors no serious difficulty of design was encountered. Both the operators and the roundhouse foremen who are dependent on these tractors are enthusiastic about the service they provide. Six additional tractors of this type are now being built and will soon be in service.

This turntable drive has been developed under the direction of E. Marshall, electrical engineer, Great Northern Railway, St. Paul, Minn.

Piece Work on the N. Y. C.

An agreement under which the shop crafts employees on the New York Central will return to the piecework basis of payment has been concluded following lengthy negotiations between the officers of the road and B. M. Jewell, head of the Federated Shop Crafts. This agreement, which comes after years of dissensions, is the first since federal control by which a railway labor organization has approved the employment of its members under this system of remuneration. It is understood that the terms of the agreement were approved reluctantly by the union leaders, who accepted only because of anticipated approval of the piecework system by the Labor Board in the near future.

It is understood that the new agreement will result in a small increase for the New York Central's shopmen.

The agreement just concluded follows the decision delivered by the Labor Board on March 28 ordering the New York Central shopmen to be returned from a piecework to an hourly basis of pay, and another issued on May 28 suspending the observance of the prior order for a minimum period of 60 days, with a proviso attached that, if within that period the New York Central should bring the dispute to the Labor Board accompanied by a petition for a piecework system of payment, the board would agree that its decision be further suspended until final disposition of the controversy. This decision also provided that, for the period of time the employees had been paid on the piecework basis and until the question was disposed of by mutual agreement between the road and the workers or by another decision of the board, the employees should be compensated at a rate of pay the average of which should not be less than the hourly wage rates established by previous Labor Board decisions.

Since both the railroad and labor parties to the controversy have agreed upon the return of the piecework plan in the shops, the terms of the Transportation Act are satisfactorily observed. Last March, the Labor Board declared the piecework system out of conformity with the Act "because the employees were deprived of the right to negotiate such agreement through their duly authorized representatives."

The case at issue, which has run over a period of many months, was opened in February, 1921, when the New York Central closed its shops until November of the same year, in which period the greater part of its repair work was contracted for and performed in outside shops. In November, 1921, a number of the shops were opened again and the piecework basis of pay was installed. The Federated Shop Crafts asserted at this time that piecework was thus introduced without proper conference or negotiation with the authorized representatives of the employees and that the terms of the Transportation Act had consequently been violated by the road. Later the New York Central proceeded to seek agreement with the employees of each shop involved for the establishment of piecework. Petitions were circulated among the employees and their signatures solicited for attachment to the petitions. Sufficient signatures to represent a majority of the employees were thus secured, authorizing the installment of the piecework basis. The Labor Board, however, held that the provisions of the Transportation Act had not been followed and ordered further negotiations, which have resulted in the recent agreement.

Equipment Painting Section

AFTER A LAPSE of two years the Equipment Painting Section of the Mechanical Division, American Railway Association, resumed the holding of its annual meetings at the Hollenden Hotel, Cleveland, Ohio, on September 4, 5 and 6. In an address at the opening session, read in his absence by V. R. Hawthorne, the secretary, John Purcell, assistant to the vice-president, Atchison, Topeka & Santa Fe, and chairman of the Mechanical Division, attacked the popular belief that painting is done primarily for ornamentation and called the attention of the division to the increase in the responsibility placed on it by the advent of steel car construction.

The association was also addressed by F. W. Brazier, assistant to general superintendent rolling stock, New York Central, on the importance of loyalty in success.

An abstract of Mr. Purcell's address follows:

"You represent a department whose part in the successful operation of the railroads has been misunderstood and underestimated by the general public, as well as by a great many railroad officials; indeed, many painters seem to think that painting is done only for ornamentation. Improving appearances, while a desirable function of paint and varnish, is, after all, only incidental to the preservation of the equipment. On account of this misunderstanding your Section has not been given the recognition in the past that it deserves. You may be partly responsible for this, due to lack of unity in your recommendations as to the best methods to pursue. Your committee reports may not have always been positive enough in outlining the action that should be taken. Have you shaded your opinion to conform to general practice, when you knew the practice was wrong?

"Your responsibility has been greatly increased since the advent of steel car construction. Corrosion is the greatest enemy of steel or iron and as paint is the only method we have to prevent their deterioration, we look to your Section, through its committees, to try out and report the best materials that will accomplish this purpose. Do not leave it all to the committees. Be free, but fair in your criticism of reports; go on record with your opinion, whether it is for or against the reports. We expect you to devise economical methods of classifying repairs and getting equipment through the shops in the least possible time, consistent with the preservation of the equipment. You know the parts that are the most subject to corrosion. Do not fool yourself or your employer by thinking that because these parts are generally out of sight, that anything will do to get by. This is not economy, but a wilful waste of time and material that will eventually cause the blocking of shop output when the time comes that repairs cannot be further postponed. It is better to spend a dollar more for paint protection now than it is to later spend ten dollars for steel repairs.

"I would like to impress on you the necessity of having men trained ready to take the place of any man you have in your shops. One great fault of the paint foreman is failure to have men properly trained to do high-class graining or ornamental sign work, and then having recourse to the rather unfair method of recommending the elimination of the work and the substitution of another method which does not require as much skill but cheapens the appearance of the equipment and in reality costs more to maintain in the long run. Teach your men, and especially your apprentices, that the main function of paint is to preserve the equipment. Train your apprentices in the knowledge of what constitutes a good paint, what causes corrosion and how to prevent it, and you will be giving the company you work for the service that we all desire and that our stockholders are demanding."

This report on Protection of Steel Equipment first took up the relative merits of sandblasting and emulsion methods of removing paint. The committee reported that its investigation indicated that paint can be removed by the sand blast at one-half the cost of the use of paint removers and cited cases in which failure to remove all traces of the remover solution from cracks or other inaccessible points had resulted in the destruction of the finish subsequently applied.

The importance of avoiding all pockets in the construction of equipment, where cinders and dust may accumulate, later to be acted on by moisture to start acid corrosion, was emphasized as was the application of a good inhibitive to all concealed metal to metal surfaces, when built.

The same committee also referred to the prejudice which has developed against the spray system of equipment painting and expressed the opinion that the improvements in equipment and methods of handling it have largely removed the objections to its use. Photographs were submitted showing the results that have been obtained by the Santa Fe in applying all but the knifing coat to locomotive tenders with spray equipment. The photographs show a finish of highly satisfactory depth, smoothness and brilliance. The discussion brought out the fact that the use of the spray is effecting net savings of from $1 to $3 each in painting box cars, and from $5 to $20 in painting locomotives.

The Conference Committee on Specifications for Paints and Paint Materials presented to the Section a report outlining the recommendations it had previously submitted to the Specifications Committee of the Mechanical Division, viz.

Specifications for mixed paints do not prevent the substitution of inferior goods. The only advantage to be derived from buying paints on specification is the supposition that a competitive price can be secured. The latitude allowed by chemists in all their analyses is such that they are only an aid to the manufacturer who is adept in using the lowest grade of materials which will pass the tests, or who strives to find a way to beat them. Only the simplest paint mixtures can be analyzed with any degree of accuracy and after the various ingredients are separated, it is exceedingly difficult to determine their quality. This is particularly true of pigments of which there are so many different grades, though all grades analyze practically the same.

Tests made by the committees representing the Equipment Painting Section have conclusively proved that a heat processed linseed oil properly treated will give better protection against the elements that enter into the deterioration of railway equipment than can be obtained by use of raw linseed oil, but the chemist will not specify this class of oil in a paint because he cannot analyze it. Why insist on analyzing a cheap paint like mineral or carbon when we buy our high-priced primers, surfacers, enamels and varnishes upon their durability, appearance and reputation of the manufacturer to maintain the standard adopted after a practical test? Specifications should be given describing the service the paint will be subjected to.

The question will be asked, "But how are we to determine whether the paint purchased will give us the protection desired before the paint is applied and put in service?" The answer is, by film test. If a film of the paint, enamel or varnish is made and subjected to an accelerated test of the elements it will be required to meet in service, a determination of its ability to answer requirements can be made in a comparatively short time. Specifications to determine quality of turpentine and turpentine substitutes, oils, etc., are deemed advisable and necessary by the committee.

Other reports were presented on Tests; Standards; Maintenance and Care of Paint and Varnish at Terminals; Safety and Sanitation, and Classification of Painting, Repairs and Shopping of Equipment.

The following officers were elected: W. A. Buchanan (D. L. & W.) chairman; F. W. Bowers (Erie), first vice-chairman; A. E. Green (C. & N. W.), second vice-chairman.

General News Department

The Pennsylvania Railroad has petitioned the Interstate Commerce Commission to modify the automatic train control order of June 13, 1921, by substituting a division of the line between Baltimore, Md., and Harrisburg, Pa., for the line between Philadelphia and Pittsburgh as the location for the installation required by the commission. The commission is also asked to make an inspection and test of the apparatus now installed on the Lewistown division (about 50 miles), to the end that the system may be approved before the road proceeds at great expense with an installation on other divisions. This installation, which was put in service on July 11, has already cost $300,000.

Port Terminal Operating Organization

F. W. Hersey, director of commerce, Port of Wilmington, Del., will speak on Port Terminal Operating Organization at the meeting of the Society of Terminal Engineers, which will be held at the Engineering Societies Building, 29 West 39th street, New York, Tuesday evening, September 11.

Increased Pay for P. R. R. Foremen

Increases in wages of $10 a month to track foremen and $5 a month to bridge and building foremen, assistant foremen and inspectors of bridges and buildings have been granted by the Pennsylvania, effective September 16. The increases aggregate $550,102 annually and will affect 3,594 employees.

What Is Your Material Handling Problem?

The opening meeting of the fall season of the Canadian Railway Club will be held at the Windsor Hotel, Montreal, on Tuesday evening, September 11, at 8:30. E. T. Spidy, assistant superintendent, Dominion Engineering Works, Ltd., will give an address on "What Is Your Material Handling Problem?"

Southeastern Carmen's Association

The second session of the Southeastern Carmen's Association will be held at the Hotel Ansley, Atlanta, Ga., September 17 and 18. The following papers will be presented for discussion: Co-operation, W. W. Waits, Southern; Care and Maintenance Freight Air Brakes, A. G. Huston, Westinghouse Air Brake Company; Handling of Explosives and Inflammables, W. H. Evarts, Bureau of Explosives; Claims Prevention, F. Whittemore, New York, Chicago & St. Louis; A. R. A. Billing, B. F. Jameson, Southern.

Earnings and Expenses for July

The Class I railroads in July had a net railway operating income on the basis of an annual rate of return of 4.93 per cent on their tentative valuation as fixed by the Interstate Commerce Commission for rate making purposes, including additions and betterments up to January 1, 1923. The net operating income for the month was $84,591,400. In the Eastern district the rate earned was 5.60 per cent; the Southern district, 5.26 per cent; and the Western district, 4.05 per cent.

In July last year the same carriers earned a net operating income of $69,321,000, which was at the annual rate of return of 4.12 per cent. In June this year the rate was 5.47 per cent. On July 1 last year a reduction of about 10 per cent in freight rates went into effect. Twenty-nine Class I railroads in July operated at a loss, of which 8 were in the Eastern district, 5 in the Southern and 16 in the Western district.

Operating revenues in July totaled $535,577,300, an increase of $91,870,000 or 20.7 per cent as compared with same month last year, while operating expenses amounted to $414,333,300, an increase of $73,377,100, or 21.5 per cent.

For the first seven months this year the net operating income represented an annual rate of return of 5.51 per cent, amounting to $528,219,300, as compared with $418,394,650 or 4.46 per cent for the corresponding period in 1922. In the Eastern district for the first seven months the net was at the rate of 6.40 per cent, or $288,484,000; in the Southern district 6.47 per cent or $77,624,750, and in the Western district 4.17 per cent or $162,110,550.

The Interstate Commerce Commission has not fixed the tentative valuation of the carriers by sub-districts, but the annual rate of return of the carriers for the first seven months this year, based on their property investment, was 4.83 per cent and the net by districts for the first seven months this year with the percentages based on property investment account in each district are as follows:

New England district	$7,608,000	1.58 per cent
Great Lakes district	117,733,300	6.45 per cent
Ohio-Ind.-Alleg. district	134,541,400	5.96 per cent
Pocahontas district	28,601,250	6.17 per cent
Southern district	77,624,750	5.48 per cent
Northwestern district	39,807,000	2.56 per cent
Central Western district	87,676,960	4.45 per cent
Southwestern district	34,626,550	3.54 per cent

Class I carriers in the Eastern district, according to reports complete except for the Monongahela Connecting, had a net operating income in July of $47,989,900, which was at the annual rate of return of 5.60 per cent. Freight traffic in the Eastern district, according to incomplete reports, was approximately 64 per cent greater than during the same month last year, due principally to the miners' strike which affected coal shipments last year. In July last year, their net operating income was $24,262,000 or 2.90 per cent. Operating revenues of the Eastern carriers totaled $278,791,200 in July this year, an increase of more than 30 per cent over the same month one year ago, while operating expenses amounted to $212,642,000, or an increase of 22½ per cent.

The carriers in the Southern district had a net operating income of $7,708,400 which was at the annual rate of return of 5.26 per cent. Freight traffic on the Southern roads showed an increase of about 30 per cent over the same month last year. The net operating income of the Southern carriers in July last year was $6,477,285, or 4.51 per cent. Operating revenues of the Southern carriers in July this year totaled $63,757,500, an increase of 18.2 per cent, while operating expenses totaled $51,211,400, an increase of 18.7 per cent.

Carriers in the Western district had in July a net operating income of $28,893,000 which was at the annual rate of return of 4.05 per cent, as compared with $38,581,600 or 5.51 per cent in July last year. Freight traffic in the Western districts in July showed an increase of approximately 25 per cent over the same month one year ago. Operating revenues in the Western district amounted to $194,028,500, an increase of 9.8 per cent over July one year ago, while their operating expenses totaled $150,479,400, an increase of 21.3 per cent over July last year.

Report on Durand Derailment

The Interstate Commerce Commission has issued a report on the derailment on the Grand Trunk Western, near Durand, Mich., on June 5, when five persons were killed. An eastbound special passenger train, consisting of locomotive 5030 with one baggage car and eight coaches ran off the track, on a straight line, while moving at from 25 to 50 miles an hour, and the locomotive was overturned. The first two cars were destroyed. Two passengers, one musician, the engineman and the fireman were killed and 25 passengers and two employees were injured. The report is dated July 7. It is accompanied by photographs showing that the track of this railroad at this point was in very poor condition; and that is given as the cause of the derailment. The immediate failure was an overturned rail. The inspector found a large number of broken, defective and rail-cut ties, and many low joints, loose spikes and braced rails. The ballast was poor, and in

general the track was not fit for high speed trains. It appears, however, that under the rules passenger trains were allowed to run as fast as 50 miles an hour. The report cites the testimony of officers of the roads, at the inquiry, seemingly designed to justify this speed limit; but this testimony, when compared with the photographs, appears to be worthless.

Steam Railway Accidents—First Quarter, 1923

The following is a summary of railroad accident statistics based on monthly reports of railway accidents made to the Interstate Commerce Commission by carriers in compliance with the accident reports act. The information is given in advance of the issuance of the printed accident bulletin covering the first quarter of 1923, to be known as Accident Bulletin No. 88, which will present the statistics in greater detail.

Steel Treaters' Convention

The fifth annual convention and international steel exposition of the American Society for Steel Treating is scheduled to be held in Pittsburgh, Pa., October 8 to 12, inclusive. The headquarters of the convention will be at the William Penn hotel; and if the activities of committees are a sign of possible success, there is no doubt that this convention will equal or surpass any of those previously held. Over 150 members of the Pittsburgh chapter are actively serving on the various committees. A notable feature this year will be the hardness symposium, to be held by a special committee of the National Research Council, an interesting list of papers having been prepared. The demand for exhibition space has been heavy. Eighteen companies have already reserved space and indicated that they plan to have exhibits in operation.

SUMMARY OF CASUALTIES IN RAILROAD ACCIDENTS FOR THE PERIOD JANUARY, FEBRUARY AND MARCH, OF THE YEARS 1923 AND 1922

Kind of accident	Total trespassers and non-trespassers				Total trespassers				Total non-trespassers			
	1923		1922		1923		1922		1923		1922	
	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured
Train Accidents—												
Collisions	52	653	19	328	4	1	4	3	48	652	15	325
Derailments	39	548	35	358	8	17	5	11	31	531	30	347
Locomotive-boiler accidents	13	25	2	10	...	1	...	1	13	24	2	9
Other locomotive accidents	...	3	...	4	...	...	...	...	...	3	...	4
Miscellaneous	5	58	4	19	...	...	1	...	5	58	3	19
Total	109	1,287	60	719	12	19	10	15	97	1,268	50	704
Train-service Accidents—												
Coupling or uncoupling cars	25	493	25	311	...	...	...	...	25	493	25	311
Coupling or uncoupling air hose	10	135	4	97	...	...	...	...	10	135	4	97
Operating locomotives	5	2,301	5	1,283	...	...	...	...	5	2,301	5	1,283
Operating hand brakes	9	623	10	440	...	...	...	...	9	623	10	440
Operating switches	1	310	...	277	...	...	...	...	1	310	...	277
Contact with fixed structures	10	214	10	169	3	9	2	21	7	205	8	148
Getting on or off cars	119	2,874	105	1,935	82	216	83	237	37	2,658	22	1,698
Highway grade crossings	(a)415	(a)1,335	(b)311	(b)940	38	42	26	43	377	1,293	285	897
Struck or run over elsewhere	608	541	494	417	371	201	360	186	237	340	134	231
Miscellaneous	214	4,092	130	3,282	73	127	62	104	141	3,965	68	3,178
Total	1,416	12,918	1,094	9,151	567	595	533	591	849	12,323	561	8,560
Grand total	1,525	14,205	1,154	9,870	579	614	543	606	946	13,591	611	9,264
Increase (per cent)	32.1	43.9	...	...	6.6	1.3	...	...	54.8	46.7	...	...

(a) Excludes 53 casualties to non-trespassers and 1 to trespassers in 4 derailments at highway grade crossings, as follows: Killed—2 trainmen, 2 other employees, 1 passenger, 1 trespasser; injured—4 trainmen, 1 other employee, 1 person carried under contract and 42 passengers.

(b) Excludes 8 casualties to non-trespassers in 1 derailment at a highway grade crossing, as follows: Killed—2 trainmen; injured—5 passengers and 1 person carried under contract.

Kind of accident	Non-trespassers															
	Employees on duty															
	Trainmen				Other				Passengers				Other			
	1923		1922		1923		1922		1923		1922		1923		1922	
	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured
Train Accidents—																
Collisions	44	243	13	140	3	34	1	22	...	321	...	146	1	54	1	17
Derailments	22	190	17	134	5	41	6	18	2	237	7	165	2	63	...	30
Locomotive-boiler accidents	13	24	2	8	...	...	...	1	...	...	...	...	...	...	...	...
Other locomotive accidents	...	2	...	4	...	1	...	...	...	...	...	...	...	...	...	...
Miscellaneous	3	18	...	6	1	5	3	9	...	5	...	...	1	30	...	4
Total	82	477	32	292	9	81	10	50	2	563	7	311	4	147	1	51
Train-service Accidents—																
Coupling or uncoupling cars	25	476	25	304	...	17	...	7	...	...	...	...	...	...	...	...
Coupling or uncoupling air hose	3	113	3	86	7	22	1	11	...	...	...	...	...	...	...	...
Operating locomotives	5	2,272	5	1,262	...	29	...	21	...	...	...	...	...	...	...	...
Operating hand brakes	8	621	10	439	1	2	...	1	...	...	...	...	...	...	...	...
Operating switches	1	297	...	250	...	13	...	27	...	...	...	...	...	...	...	...
Contact with fixed structures	6	193	7	142	1	7	...	3	...	1	...	1	...	4	1	2
Getting on or off cars	23	2,162	11	1,277	5	107	1	75	9	336	8	323	...	53	2	23
Highway grade crossings	...	9	...	12	11	8	6	11	...	1	...	...	366	1,275	279	874
Struck or run over elsewhere	55	92	15	60	123	151	80	93	11	22	6	13	48	75	33	65
Miscellaneous	88	3,010	45	2,271	36	359	14	321	2	359	2	387	15	237	7	199
Total	214	9,345	121	6,103	184	715	102	570	22	719	16	724	429	1,644	322	1,163
Grand total	296	9,722	153	6,395	193	796	112	620	24	1,282	23	1,035	433	1,791	323	1,214
Increase (per cent)	93.5	52.0	...	...	72.3	28.4	...	...	4.3	23.9	...	...	34.1	47.5	...	...

		1923	1922	Increase
Industrial and other non-train accidents	Persons killed	103	83	24.1%
	Persons injured	27,511	17,526	57.0%

		January		February		March	
		1923	1922	1923	1922	1923	1922
Total casualties at highway grade crossings—by months	Persons killed	158	114	126	82	137	117
	Persons injured	511	396	414	263	458	287

Number of locomotive-miles (thousands)	January, February and March	1923	445,102
		1922	382,194

Traffic News

The Consolidated Ticket Office at Memphis, Tenn., was discontinued on August 31, and the several roads now have independent offices at 60, 64, 70, 72 and 74 Monroe avenue.

The Missouri Pacific loaded locally and received from connections 130,810 cars of freight during August compared with a previous high monthly record of 125,347 during October, 1916.

Tourist travel on the Union Pacific this year is 40 per cent heavier than in any previous year except during the Panama Pacific Exposition in 1915, according to H. A. Buck, district passenger agent at San Francisco, Cal.

The Southern Pacific has 13,000 refrigerator cars on its lines west of Ogden and El Paso, compared with 3,800 cars last year at this time. Due to the early crop a total of 16,000 cars of tree fruit have been shipped to date. compared with 8,800 cars at the same time last year.

The Interstate Commerce Commission has announced that hearings in connection with its investigation of rates and charges on anthracite coal undertaken at the suggestion of the United States Coal Commission will begin at Pittsburgh on September 24 before Examiner Disque.

To avoid congestion at the seaboard the Canadian railways do not accept shipments of grain except on permits issued by the railway at point of origin. Permits covering grain for export will be issued only to cover bona fide export contracts with steamer space actually booked.

The Terminal Railroad Association of St. Louis, Mo., established a record during August by interchanging 217,651 loaded cars, compared with 182,000 during August, 1922. For the first eight months of this year, 1,642,024 loaded cars have been moved, compared with 1,299,310 during the same period of 1922, which is an increase of 26 per cent.

The Western Fruit Express Company, H. B. Spencer, president, announces that it has leased and is now operating the refrigerator cars of the Great Northern Railway, about 5,915 cars. These cars are to be re-lettered "W. F. E. X." and will be renumbered. They are operated on a mileage basis and reports are to be sent to the headquarters of the Western Fruit Express Company, Washington, D. C.

Canadian Government Railways Ask Reopening of Assigned Car Case

The Canadian National has joined railways of the United States and various companies owning private coal cars in asking the Interstate Commerce Commission to reopen the proceedings in which the commission ordered the abolition of the assigned car practice and prescribed rules for the distribution of private coal cars in times of shortage. The petition of the Canadian National Railways shows that the Canadian lines have purchased large numbers of coal cars which are sent to mines in the United States for their fuel supply and it asks that this company and various other carriers who are private car owners who have not been heard in testimony in this proceeding be now afforded opportunity to make known to the commission the details of car supply, coal supply, costs of fuel, what would be the approximate result in enormously increased prices as a result of the abrogation of the assigned car rule, and the enormously added cost of purchasing fuel in the open market. The petition offers to show that there has been no discrimination or preferential use of its railroad facilities, but that these Canadian cars have facilitated the use of carriers' equipment by the efficient use of these cars in an uninterrupted flow. The commission some time ago postponed the effective date of its order from September 1 to October 1 and it is understood that attorneys for the railroads and the owners of private cars have given consideration to an intent to enjoin the enforcement of the order unless the commission further postpones the date and reopens the case.

Commission and Court News

Interstate Commerce Commission

The Interstate Commerce Commission has postponed and cancelled the series of hearings which it had previously announced, on the administration of the fourth section of the interstate commerce act, for the purpose of gathering information called for by a Senate resolution introduced by Senator Gooding. The hearings were to be held at Chicago on September 4 and continuing at Denver, Salt Lake City and various other points. It is understood that other dates will be announced later.

State Commissions

The order of the Missouri Public Service Commission directing the Wabash to build a viaduct over its tracks at Delmar boulevard, St. Louis, Mo., has been reversed by a Circuit court in that city and remanded to the commission. The commission immediately appealed to the Supreme Court of Missouri. The order of the commission directed that the railroad tracks should be depressed; the Wabash contended for an elevated crossing for its tracks above the street.

The Public Service Commission of Georgia on September 1 issued a general order, to go into effect on September 15, prescribing revised freight rates on a number of important commodities, including iron and steel articles, sugar, cotton, canned goods and peanuts. The rates, in each case, are maximum rates, the carriers being left free to make lower rates provided there is no discrimination between persons or localities. Most of the changes are reductions, especially between the larger places; but some are increases.

Court News

Examination by Consignee Equivalent to Notice of Arrival

The Alabama Supreme Court holds that where cotton consigned to the order of shippers, notify consignee, arrived July 24 and the consignee saw and examined it at the station on July 26, and knew from whence it came, this was notice to him of its arrival.—H. & L. M. Worten Cotton Co. v. Southern (Ala.) 94 So. 726.

Knowledge of Obstruction Projecting on Track

When a railroad company, for its advantage, uses a spur track which it does not own, it owes the duty to operatives of trains to use ordinary care; but a switchman, riding on a corner of a flat car, whose foot was crushed against the car by a skidpole protruding too far over a nearby skidway, must show, to recover damages, that the pole was placed there by railroad employees, or to their knowledge, or had been there long enough to justify the inference that failure to know was due to want of proper care.—Texarkana & Ft. Smith v. La Velle (Tex. Civ. App.) 247 S. W. 617.

Company Relieved by Statute from Liability for Negligence of Company Using Its Tracks

The Florida Supreme Court holds that the effect of sections 4538 and 4540 Florida Gen. St. 1920, as to interchange of facilities, in an action against the Seaboard Air Line for an injury caused by a Gulf Coast train being operated on the Seaboard track is to eliminate the element of agreement in the use of the track which would make the owner of the track liable; for the right to use the tracks for the purpose stated in the statutes was given without the owner's consent, thus relieving the Seaboard from liability for negligence of the Gulf Coast in a use of the track not participated in by the Seaboard.—S. A. L. v. Knickerbocker (Fla.) 94 So. 501.

Foreign Railway News

The Fastest Train in Great Britain

The train illustrated herewith has the fastest schedule of any in Great Britain. It is operated by the Great Western Railway from Cheltenham to Paddington (London) and covers the distance from Swindon to Paddington, 77¼ miles, in 75 minutes—or at the rate 61.8 miles per hour.

Miles	Distant from Paddington	Schedule time p. m.	Actual time p. m.
77.3	Swindon	3:45	3:45
53.1	Didcot	4:09	4:09½
36	Reading	4:25	4:24
24.1	Maidenhead	4:35½	4:33½
18.5	Slough	4:40½	4:38½
9.1	Southall	4:49	4:47
....	Paddington	5:00	4:57

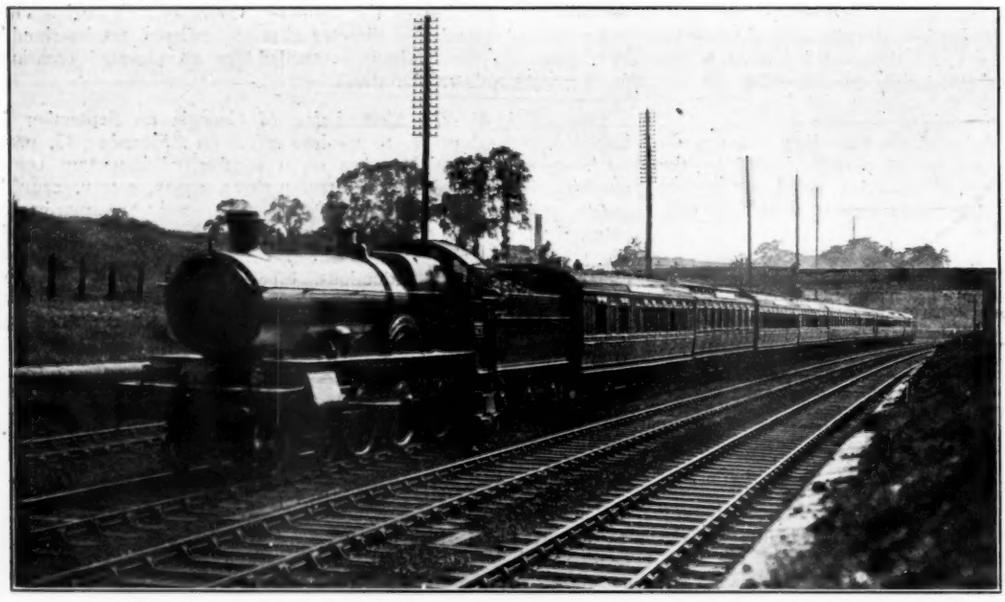
On the day when the photographs shown herewith were taken, the day of its first run, the train gained on its schedule so that the Swindon-Paddington run was made at an average speed slightly in excess of 64¼ miles per hour. The schedule time and actual time on the initial run are shown in the accompanying table. At one time a speed of 83 miles per hour was reached.

The locomotive shown in the illustrations is No. 2915, named the "St. Bartholomew," a two-cylinder, 4-6-0 type. It has 18½ in. by 30 in. cylinders, drivers 80½ in. high, a heating surface of 2,124.8 sq. ft. and has a working pressure of 225 lb.

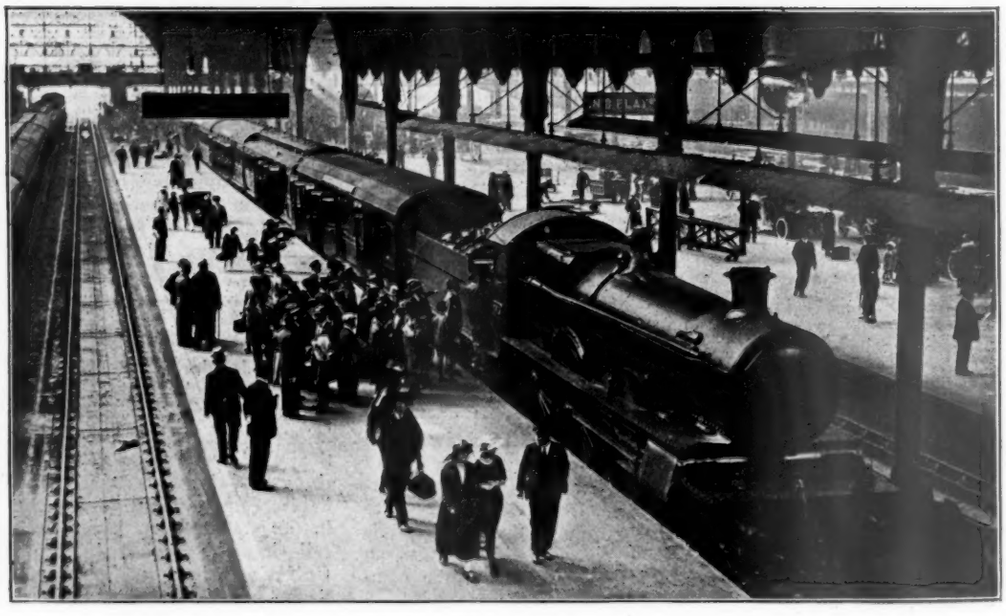
The locomotive is green in color and the cars chocolate and cream, according to Great Western standards. The train weighed 250 long tons.

Railway Electrification in Brazil

A contract for the electrification of the Campos de Jordão Railway in Brazil, which has been awarded to the English Electric Company by the government of São Paulo, includes the electrification of an existing metre-gage railway, the supply and erection of some 15 miles of 30,000 volt three-phase transmission line and of about 30 miles of overhead catenary construction on the 1,500 volt d.c. system, the construction and equipment of a substation,



The Fastest Train in Britain Nearing London on Its First Run, July 9 (Photo by Courtesy of the Railway Gazette—London—and of the Photographer, F. E. Mackay)



Arrival at Paddington Station Three Minutes Ahead of Schedule—Passengers Congratulating the Engineman (Engraving by Courtesy of the Great Western Railway Magazine)

and the building of motor coaches for both passenger and freight service, according to the Times (London).

At the substation the 30,000 volt three-phase 50-cycle supply current will be transformed down to 2,000 volts, and converted into direct current at 1,500 volts by a 500-kw. synchronous motor generator. The electrical equipment of the motor coaches will comprise four self-ventilated motors, each wound for 750 volts, the motors being connected two in series, and the two pairs operated in series-parallel. The passenger coaches will seat forty passengers, and the freight coaches, which are to be of the covered type, will carry ten tons each.

One-third of the total route length of the line is level, but the remainder is over gradients, of which the most severe is 10½ per cent, and there are about eight miles of track on which the gradients range from 6 per cent upwards. On that account the motor coaches are to be equipped with four different braking systems—hand, air, rheostatic and electro-magnetic track brakes. The last are intended for use in emergency only.

The Earthquake in Japan

Virtually all the railroads of the island of Honjo, the principal island of Japan, were damaged heavily by the earthquakes which occurred on Saturday and Sunday, September 1 and 2. The Tokaido line, running from Tokio to Kobe, probably suffered worst, according to press reports. On this line the rails were bent and twisted by the writhings of the earth, bridges were torn from their foundations, many station buildings were wrecked or burned and a number of trains, both freight and passenger, were thrown from the rails and wrecked. Five hundred passengers are reported to have been killed in a train.

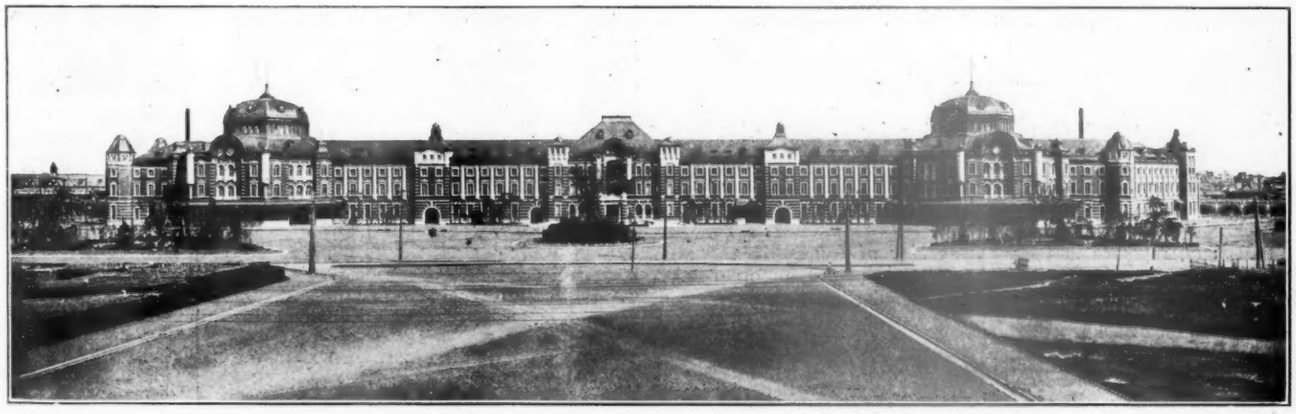
Sir William Acworth Returns to London —Report on Austrian Railways Completed

Sir William Acworth, who has been in Austria advising with respect to the reorganization of the State Railways, has returned to London, his work completed, according to the Times (London).

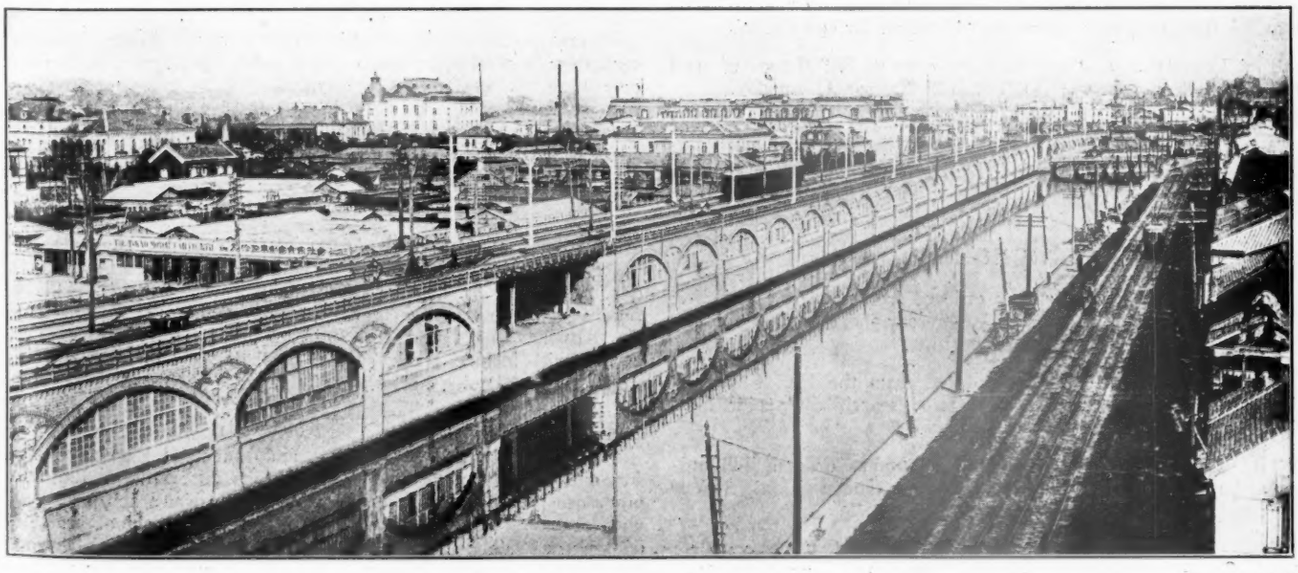
The reorganization of the State Railways was undertaken under the auspices of the League of Nations as a part of its program for the financial rehabilitation of the country under the direction of the League's Committee of Control, which has named Dr. Zimmerman as its high commissioner in charge of its work.

Collaborating with Sir William in planning for the rehabilitation of the Austrian State Railways was Dr. Herold of the Swiss Federal Railways. Their report, which will consist of 120 pages, has not been issued as yet, but great reforms in the railway administration have already been put into effect—one of them being a great reduction in working forces (the railways have been greatly over-manned) and the other the taking over of the operation by a board of directors, not directly responsible to every change in the political constitution of the government. Heretofore the railways were a department of the government. Now they are operated under a system similar in some respects to that obtaining on the Canadian National—government ownership but an operating organization of railway men who report, not to the government, but to a board of directors.

It has been predicted that the Austrian State Railways can be made self-supporting within a period of two years if the recommended practices are adopted.



Front View of Tokyo Station—Said to Have Been Destroyed by Earthquake



Track Elevation in Tokyo

Equipment and Supplies

Locomotives

THE MESABI IRON COMPANY has ordered one 0-6-0 type locomotive from the American Locomotive Company.

Freight Cars

THE ELGIN, JOLIET & EASTERN is inquiring for 500 steel underframes.

THE TEXAS COMPANY is inquiring for 10 tank cars of 6,000 gal. capacity.

THE HAVANA CENTRAL is inquiring for 25 steel underframes for cane cars of 15 tons' capacity.

THE ATCHISON, TOPEKA & SANTA FE, reported in the *Railway Age* of July 7 as inquiring for 300 mill end gondola cars and July 21 for 200 flat cars, has ordered this equipment from the Pullman Company.

THE CHESAPEAKE & OHIO, reported in the *Railway Age* of September 1 as asking for prices on repairs to 500 steel coal cars of 55 tons' capacity, has arranged for the rebuilding of these cars as follows: To the Newport News Shipbuilding & Drydock Company, Newport News, Va., 250 cars and to the American Car & Foundry Company, Huntington, W. Va., 250 cars.

Passenger Cars

THE CHESAPEAKE & OHIO is inquiring for 6 combination mail and express cars 70-ft. long.

THE GULF COAST LINES are inquiring for 4 coaches, 2 baggage cars, 2 combination baggage and mail cars and 1 cafe car.

THE ERIE, reported in the *Railway Age* of August 11 as contemplating the purchase of 44 coaches, has placed an order for 44 steel surburban coaches with the Pressed Steel Car Company.

Iron and Steel

THE ERIE has ordered 250 tons of bridge steel from the Bethlehem Steel Bridge Company.

THE CENTRAL RAILROAD OF NEW JERSEY has ordered 22,000 tons of structural steel from the American Bridge Co.

THE LOUISVILLE & NASHVILLE has ordered 30,000 tons of steel rails from the Tennessee Coal, Iron & Railroad Company.

THE SEABOARD AIR LINE, reported in the *Railway Age* of July 21 as inquiring for 250 tons of steel for a bridge to be built over Lynch's river in South Carolina, has ordered this tonnage from local parties.

Signaling

THE NEW YORK CENTRAL has ordered from the Hall Switch & Signal Company, Garwood, N. J., 45 semaphore signals for use west of Buffalo; style L, three position.

THE CANADIAN PACIFIC has ordered from the Hall Switch & Signal Company, Garwood, N. J., two "searchlight" color light signals with relays and other apparatus.

THE CHICAGO, ROCK ISLAND & PACIFIC has ordered 148 universal lamps, for use at highway crossings, from the Hall Switch & Signal Company, Garwood, N. J.

THE CHICAGO GREAT WESTERN has ordered three complete flashing lamp outfits, for highway crossings, from the Hall Switch & Signal Company, Garwood, N. J.

Supply Trade News

David G. White has joined the staff of the **Hardwood Manufacturers Institute,** Chicago, as forest economist and as an assistant to J. M. Pritchard, secretary-manager.

The Standard Steel & Bearings, Incorporated, has moved its Philadelphia, Pa., plant to Plainville, Conn. All mail matter for the Standard Steel & Bearings, Inc., should in future be addressed to Plainville instead of Philadelphia.

C. Washburn, vice-president of the Bond County State Bank, Pocahontas, Ill., and formerly president of the Three States Tie Company, Hastings, Mich., has become associated with **W. A. Paul,** dealer in railroad ties, St. Louis, Mo., and has formed a company to be known as **Paul & Washburn,** located in the Railway Exchange building, St. Louis, Mo.

The Continental Lumber & Tie Company has been incorporated at Peoria, Ill., with a capital stock of $1,500,000. Sales headquarters will be at St. Louis, Mo. The company represents a combination of several concerns operating saw mills, railroads, steamboats, barge lines and the rafting of logs. The incorporators are C. J. Case; Leonard Hillis; W. C. McClure and G. A. Case, of Peoria, Ill.; J. H. Hines, Memphis, Tenn.; Sterling Lumber Company, Bastrop, La.; J. H. Allen, St. Louis, Mo.; B. J. Altheimer, Chicago; J. H. Hines, Inc., and B. K. Boyston, Memphis, Tenn., and Dr. J. Leland Boogher, St. Louis, Mo.

The International Trade Developer, Inc., Chicago, with many foreign branch offices, publishers of the International Trade Developer Monthly and the International Trade Developer Annual is desirous of securing for **J. W. Wallace & Co.,** 246 Wakefield street, Wellington, N. Z., the sole representation of American firms manufacturing or exporting the following: Railway and tram rails, tubular telegraph poles, copper and aluminum wire, shovels, and undercarriage springs for vehicles and all rolling stock, horse-shoes, reinforcing rods, steel conduit, insulators, picks, etc. J. W. Wallace & Co. has been in business for many years and has built up a large clientele throughout New Zealand. This company would like to receive quotations c. i. f. main ports of New Zealand and also desires complete information regarding packing, weights, etc., to assist in giving definite information as to landed cost. It also wants literature and information as to code addresses and codes used by correspondents.

Trade Publications

RIVETERS.—The Hanna Engineering Works, Chicago, has recently issued a 64-page, illustrated booklet, Catalogue No. 5, fully describing the design and construction of its compression yoke riveters, which range in sizes from 4 in. to 21 ft. reach, and in capacities from 10 to 150 tons. These riveters are particularly adapted for use in the boiler, tank, structural, bridge, car, automotive and steel shipbuilding industries.

THE ANNUAL OUT-DOOR ATHLETIC MEET of the employees of the Pennsylvania Railroad will be held at Altoona, Pa., on Saturday, September 22. The system championships for 1923 will be fought out between the four operating regions of the system, the Altoona works and the Philadelphia general offices. The events will include track sports, baseball, tug of war, tennis, trap shooting, quoits, horseshoe pitching and swimming.

THE CINCINNATI FALL FESTIVAL and Industrial Exposition has for one of its most interesting exhibits a Southern Railway miniature passenger train in operation on an oval track, equipped with automatic block signals working just as in actual practice on the road. The train consists of three coaches, and is driven by electricity, taken from a third rail, though the locomotive looks like one of the regular steam type.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company contemplates the construction of a branch line to Longbeach, Cal., either by the extension of its line now under construction at Wilmington or by the route skirting the eastern city limits of Los Angeles through Hobart.

BALTIMORE & OHIO.—This company, and not the Chesapeake & Ohio as incorrectly reported in the *Railway Age* of September 1, has awarded a contract for additions to its tie treating plant at Green Spring, W. Va., to William Dwyer, of Cincinnati.

CHICAGO JUNCTION.—This company has purchased approximately 135,000 sq. ft. of land at the south end of its yards at Forty-seventh street, Chicago, on which it will lay additional yard tracks.

ILLINOIS CENTRAL.—This company, jointly with the Pennsylvania, will construct a new passenger station at Effingham, Ill. This company has also authorized the construction of a flood wall at Vicksburg, Miss., to cost approximately $125,000, and improvements to the Stuyvesant docks at New Orleans, La., to cost approximately $380,000.

NATIONAL RAILWAYS OF MEXICO.—This company has awarded a contract to J. H. Maxey, Yuma, Ariz., for the construction of last 90 miles of new line from Mexicali to the Gulf of California, which was reported in the *Railway Age* of June 16. The awarding of the contract for the grading of the first 34 miles to the Pioneer Transfer Company, Calexico, Cal., was reported in the *Railway Age* of August 11.

PHILADELPHIA & READING.—Orders for approximately 2,000,000 bricks to be used in the construction of the new $3,000,000 Camden (N. J.) Terminal of this company's seashore lines have been placed. These orders call for Pennsylvania shale brick for the ordinary brick work, for outside face brick and for inside face brick. The shale brick is being furnished by the Glen Gary Shale Brick Co., Wyomissing, Pa., and by the McAvoy Vitrified Brick Co., Perkiomen Junction, Pa. The outside face brick is being furnished by the Hydraulic Pressed Brick Co., Winslow Junction, N. J., and the inside face by O. W. Ketcham, Philadelphia, Pa. Orders have also been placed for 10,000 tons of pebbles and 8,000 tons of sand with the DeFrain Sand Co., Philadelphia, Pa.

LEHIGH & NEW ENGLAND.—This company has approved a plan for the revision of grade and the construction of a new main line and sidings for a distance of approximately one mile, at Quarry Junction, Pa., between Pen Argyl, Pa., and Portland, Pa., and contract has been awarded to F. H. Clement & Company, of Bethlehem, Pa., for the grading, concrete masonry, drainage, track laying and other details in connection with the work. Quarry Junction is the summit of adverse grades, where frequent break-in-twos and occasional run-aways have occurred. The grade revision eliminates the adverse grades and will be conducive to safer operation of trains. Later on it is expected to take out some sags in the grade between Quarry Junction and Portland, making a continuous grade between the two points.

MISSOURI PACIFIC.—This company contemplates the removal of its engine terminal from Hoxie, Ark., to Poplar Bluffs, Mo. Plans are being made for enlargement to the roundhouse and shop facilities at Poplar Bluffs.

SOUTHERN PACIFIC.—This company will construct additional yard tracks at the Beale street yards, San Francisco, Cal., at a cost of approximately $122,000. This company also contemplates changes in its line entering Portland, Ore., and improvements to its terminals at that place to cost approximately $4,500,000.

SOUTHERN PACIFIC.—This company has awarded a contract to John Hampshire, Grants Pass, Ore., for the construction of the first section, 31 miles long, of the new line from Eugene, Ore., to Klamath Falls, which is known as the Natron cut-off.

Railway Financial News

DENVER & RIO GRANDE WESTERN.—*Hearing on Application to Issue Securities.*—The Interstate Commerce Commission has reassigned the hearing on this company's application for authority to issue securities so that it will be held at Denver, Colo., on October 3 before Charles D. Mahaffie of the commission's Bureau of Finance instead of at Washington on September 10.

Report of B. B. Greer.—See article on another page of this issue entitled "Denver & Rio Grande Western Needs Many Improvements."

PENNSYLVANIA.—*Asks Authority to Guarantee Securities of Subsidiaries.*—This company has applied to the Interstate Commerce Commission for authority to assume obligation and liability as guarantor in connection with an issue of $1,209,350 of special stock by the Erie & Pittsburgh and $1,824,000 general mortgage 4½ per cent bonds by the United New Jersey Railroad & Canal Company. Applications for authority to issue these securities were also filed by the subsidiary companies, which are to deliver the securities to the Pennsylvania.

PERE MARQUETTE.—*Dividends.*—The regular quarterly dividends of 1 per cent on the common and 1¼ per cent on both the 5 per cent prior preference and 5 per cent preferred stocks were declared at the meeting of directors on Wednesday. The common disbursement is payable October 1 to stock of record September 14, while the preferred payments will both be made November 1 to stock of record October 15.

SOUTHERN PACIFIC.—*Asks Authority to Acquire Road.*—This company has applied to the Interstate Commerce Commission for authority to acquire from Frank G. Drum control of the Chowchilla Pacific, which extends for a distance of 11.68 miles from a point on the Southern Pacific in Madera County, Cal., to Dairyland, Cal.

SANTA FE & LOS ANGELES HARBOR.—*Authority to Issue Stock.*—This company, a subsidiary of the Atchison, Topeka & Santa Fe, has been authorized by the Railroad Commission of California to issue and sell at not less than par $50,000 of its common capital stock, $49,500 of such stock to be issued to the Atchison, Topeka & Santa Fe, which is authorized to acquire and own same, and the remaining $500 of the stock to be issued to the board of directors of the Santa Fe & Los Angeles Harbor. The Santa Fe & Los Angeles Harbor was incorporated to construct a new line from El Segundo, Calif., to Wilmington, a distance of approximately 20 miles. Authority has been granted it by the Railroad Commission to lease the properties and line of the new road to the Atchison, Topeka & Santa Fe.

Dividends Declared

Alabama & Vicksburg.—3½ per cent, payable September 4 to holders of record August 23.

Erie & Pittsburgh.—$.87½, quarterly, payable September 10 to holders of record August 31.

Fonda, Johnstown & Gloversville.—Preferred, 1½ per cent, quarterly, payable September 15 to holders of record September 10.

Fort Wayne & Jackson.—2¾ per cent, payable September 1.

Lackawanna Railroad of New Jersey.—1 per cent, quarterly, payable October 1 to holders of record September 8.

Newark & Bloomfield.—$1.50, semi-annually, payable October 1 to holders of record September 22.

New York, Lackawanna & Western.—1¼ per cent, quarterly, payable October 1 to holders of record September 14.

Pittsburgh, Ft. Wayne & Chicago.—Common, $1.75, quarterly, payable October 1 to holders of record September 10; preferred, $1.75, quarterly, payable October 2 to holders of record September 10.

Vicksburg, Shreveport & Pacific.—Preferred, 2½ per cent, payable September 4 to holders of record August 14.

Warren Railroad.—$1.75, semi-annually, payable October 15 to holders of record October 4.

Trend of Railway Stock and Bond Prices

	Sept. 4	Last Week	Last Year
Average price of 20 representative railway stocks	60.07	60.23	73.07
Average price of 20 representative railway bonds	82.63	82.70	89.66

Railway Officers

Executive

Herbert Fitzpatrick, counsel for the Chesapeake & Ohio in the state of West Virginia, with headquarters at Huntington, W. Va., has been elected vice-president and general counsel, with headquarters at Richmond, Va., succeeding **H. T. Wickham,** who has been appointed advisory counsel.

S. A. Wilder, assistant to the general manager of the Northern Pacific, with headquarters at St. Paul, Minn., whose promotion to assistant to the vice-president in charge of operation, with the same headquarters was announced in the *Railway Age* of August 25, page 370, was born at Evanston, Ill. During his early boyhood he lived at La Crosse, Wis., where he later published a daily newspaper. He entered railway service in 1893 with the Northern Pacific in the operating department at Jamestown, N. D., and while employed studied law and was admitted to the North Dakota bar. In 1917 he was promoted to trainmaster, with headquarters at Jamestown, N. D., and in 1918 was promoted to assistant to the general manager, handling labor matters, with headquarters at St. Paul, Minn., which position he has held until his recent promotion.

S. A. Wilder

Operating

L. A. Johnson has been appointed trainmaster of the Third sub-division and branches of the Nebraska division of the Union Pacific, with headquarters at North Platte, Neb., succeeding J. M. Smith, who has resigned.

Frank E. Pettengill, retiring freight claim agent of the Boston & Albany, was born at Worcester, Mass., August 27, 1853, and entered railroad service on the Boston & Albany at Westfield, Mass., in 1873. He served as brakeman and as clerk in the general office at Springfield; and then for a time was in the service of the Northern Pacific in Minnesota and in Oregon. In 1884, he returned to the Boston & Albany, and was agent successively at Webster, Mass., Chatham, N. Y., Pittsfield, Mass., and Springfield, Mass. At the latter place he served for six years, after which (1910) he was made special agent, with headquarters at Boston. In June, 1911, he organized the freight claim department, the work of which had theretofore been done in the general freight agent's office. He has served as freight claim agent continuously since then.

I. H. Luke, assistant chief operating officer of the Denver & Rio Grande Western, with headquarters at Denver, Colo., has been promoted to general manager, with the same headquarters. The offices of chief operating officer and assistant chief operating officer have been abolished. **L. F. Wilson,** superintendent of transportation, with headquarters at Denver, has been promoted to general superintendent of transportation, with the same headquarters, the office of superintendent of transportation having been abolished. **J. T. Nedwideck,** superintendent of the Second division, with headquarters at Salida, Colo., has been promoted to general superintendent of the newly created First district, with headquarters at Pueblo, Colo. **L. W. Bowen,** general superintendent of the Colorado lines, with headquarters at Denver, has been appointed general superintendent of the newly created Second district, with headquarters at Durango, Colo., the office of general superintendent of the Colorado lines having been abolished. **J. A. MacKinnon,** division superintendent, with headquarters at Grand Junction, Colo., has been appointed acting superintendent of the Salida division, with headquarters at Salida, Colo., succeeding Mr. Nedwideck.

Traffic

R. A. Stanley has been appointed traveling freight agent of the Louisville & Nashville with headquarters at Anniston, Ala., succeeding **W. L. Evans,** promoted.

W. H. Cundey, assistant general passenger agent of the Denver & Rio Grande Western, with headquarters at Denver, Colo., has been promoted to the newly created position of general passenger agent, with the same headquarters. **P. B. McAtee,** general agent, with headquarters at Durango, Colo., has been promoted to assistant general freight and passenger agent, with the same headquarters.

Mechanical

H. H. Urbach, assistant master mechanic of the Galesburg division of the Chicago, Burlington & Quincy with headquarters at Galesburg, Ill., has been promoted to master mechanic of the Brookfield division, with headquarters at Brookfield, Mo., succeeding D. R. McGrath who has been assigned to other duties.

W. J. O'Neill, superintendent of motive power of the Second district of the Chicago, Rock Island & Pacific, with headquarters at El Reno, Okla., has been appointed general mechanical superintendent of the Denver & Rio Grande Western with headquarters at Denver, Colo. **W. W. Leman,** superintendent of motive power and car department of the Denver & Rio Grande Western, with headquarters at Denver, Colo., has resigned and the office of superintendent of motive power and car department has been abolished.

Engineering, Maintenance of Way and Signaling

R. B. Burks has been appointed assistant valuation engineer of the Chesapeake & Ohio with headquarters at Richmond, Va.

Albert Reilly, heretofore general electric inspector of the Delaware, Lackawanna & Western, has been appointed assistant signal engineer; headquarters, Hoboken, N. J.

A. O. Ridgway, assistant chief engineer of the Denver & Rio Grande Western, with headquarters at Denver, Colo., has been promoted to chief engineer, with the same headquarters, succeeding **J. G. Gwyn,** who has retired. The office of assistant chief engineer has been abolished.

Special

Dr. J. F. Roe has been appointed chief surgeon of the Denver & Rio Grande Western, with headquarters at Denver, Colo., succeeding **Dr. J. W. O'Connor,** who has retired under the pension system.

Obituary

John R. Phelan, formerly general superintendent of the Wyoming district of the Chicago, Burlington & Quincy, died at Denver, Colo., on August 28. Mr. Phelan was born on July 11, 1851, at New London, Conn., and entered railway service in 1869 in the engineering department of the West Wisconsin, which is now a part of the Chicago, St. Paul, Minneapolis & Omaha. He served on various western roads until 1882, when he was appointed roadmaster on the Burlington & Missouri River, being later promoted consecutively to trainmaster, assistant superintendent and superintendent of the Wyoming division. He was transferred to the Alliance division of the Chicago, Burlington & Quincy in November, 1902, and on May 1, 1905, was promoted to general superintendent of the Wyoming district, retiring in 1906.